



Development of Cork-Bamboo-Latex as An Alternative Composite for Bottles Stoppers

Gul n Yxj -n' Hx'x [2Rnx wj -nx Tj mm~I qj pj' 2P-j -n°] d nw'n7 [2Gwj Vj -uj J -j ~n S x -nr-j 2I -t' tj wn Nn' mm G° n° nmx S nur-x7 [2Nj ~t' xwRx -nw x I x ~ j 9 [2Gunj wm-n S ip-nunx Tj' l rv nw'x7 [2Xnwj "j T -wn' Uu" nr-j 720 [2

7Lnm-j uX-j u[wr' n~r° x oXix mm [j wnr-x2[LXXF5XP289>? =6662Hj° n#
8Lnm-j u[wr' n~r° x oXix mm [j wnr-xA[LXP5XP287?: 7; ?? 2Hj° n#
9Lnm-j u[wr' n~r° x oVj-j w 2[LVX5VX2>7; 97?? 62Hj° n#

GHYZ I Z[Gppukv n-j "nml x-t l xv yx' r'n' y-xm-l "ixwqj' knnwj -t rwp j' j wj un-wj "r" n nl x3o-mwmf "x l x-t ' "xyyn~ -' n j wm j -j l " rw'n-n' "x l -nj 'n' -' j rwj kun y-xm-l " j wmv j "n-tj u4G l x-t 3kj v kxx3j "nt l xv yx' r'n° j' "m" nux ynmk° l xv y-n' ixw3 v xumwp j wm "qn rw'n-j l "ixw kn° nmw "q-nn l xv yx' r'n rw'n-gj l n' j' ° nuuj' "qnr~ v nl qj w l j u y-xyn~m' ° n-n n' j u-j "nm k° mmw' r° v nj' -n2rv v n~ixw'n "2LZOX2l xv y-n' ixw'n "2j wmv d -xk j u j wj u' r' j rv rwp "x y-xm-l n j wj un-wj "r" n v j "n-tj u "x ° rwn l u' -n' 4 n -n' -u' xk "j rwmn° n-n l xv yj -nmkn° nmw "qn l xv yx' r'n y-xm-l nmj wm "qn l xv v n-l tj u j ppxv n-j "nml x-t "xyyn~4 O° j' yx' r'kun "x xk' n~n "qj "qn l x-t 3kj v kxx3j "nt l xv yx' r'n y-xm-l nm n t q k r' nm j p x x m j n q n' i x w x o j u l l x v y x w w " j w m r v n j -l q j -j l "n-t' d' 4N x° n "n-2r' y-n' n w' n m j ' u p q " r w l -n j ' n r w " q n m w ' r ° . o x v 6 4 = p 5 l v ° " x 6 4 ; p 5 l v ° / j w m b x -w p e v x m -u ' . o x v 6 4 9 9 S V j " x 6 4 9 = S V j / y -x m -l r w p j ' ' r n -v j " n -t j u v j r w l m -n " x k j v k x x y -n' n w l n 4 n v i p -j " i x w x o " q n ' " x y y n ~ l x v y x w w " . l x -t 2 k j v k x x 2 x ~ u j " n t / a ~ " q n ° r w n ° j ' w x " m " n l " n m 2 j ' ° n u u j ' " q n -n ° j ' w x " r' r k u n r w ' n -j l " i x w k n ° n n w ° r w n j w m l x v y x ' r ' n 4 Q w " q r ' ° x -t 2 " q n l x -t 3 k j v k x x 3 j " n t ' " x y y n ~ g k -t j " n m y -n' n w " j y x " n w ' t j u j y y u l j " i x w j ' j w j u n -w j " r " n v j " n -t j u " x ° r w n ' " x y y n ~ j w m ' r v -u j " n " q n y -x m -l " i x w x o j ' -' j r w j k u n v j " n -t j u

Qn° ° x-ni (Gppukv n-j "nmAl x-t A' "xyyn-Akj v kxxA° rwn

1. INTRODUCTION

I x-t "xyyn~ j-n y-xm-l nm o-xv "qn x-n- yj~ x o l x-t xjt 2 W-n- / -kn-R d7f4 n l x-t xjt k j t -n v x " j u v -' " k n n x w n j n ~ " q n " -n m -n j l q n ' 8 ; ° n j ~ 4 O y n -x n l n t ~ -j l " i x w " j t n ' y u j l n " n ° w w n ° n j ~ 2 n m y n w n r w p x w " q n -j n j u p -x ° " q j w m " q n -n p i x w d 8 f 4

I x-t r' j w x - " j w m r w p v j " n -t j u ° m m u - ' n m j ' j ' n j u r w p k x u n r w " q n ° r w n r w m - " ° k n l j - ' n r ' r ' j w j - j u ~ -n w n ° j k u n 2 j w m - ' j r w j k u n - j ° v j " n -t j u d 9 f 4 L - ~ " q n - v x - n 2 r " y q ° d 3 q n v d j u j w m v n l q j w l j u y - x y n ~ m ' 2 ' - l q j ' u x ° y n - v n j k u r ° " x u z - m ' j w m p j ' n ' 2 u x ° n m w ' r ° 2 q p q l x v y - n ' i k u r ° j w m n t i k u r ° 2 j w m l q n v d j u j w m v d - x k i x u p d j u ' j k u r ° y - x " m m - ' - r ' j k u n l q j - j l " n - t ' d ' " q j " j - x - ' n " q n r w ' n - n ' " x o " q n v j w - g l " - n x o l x - t ' " x y y n ~ d : f 4

I x-t r' j w j - j u l x v y x' r' n l x w " r - " n m k ° ' - k n - r w 2 " q n v j s x ~ l x v y x w w " . 9 9 3 6 ° " 4 * / A u p w w . 7 9 3 ? ° " 4 * / 2 j w j - x v j " d y x u v n - j w m - n ' y x w i k u n a ~ - n ' r ' j w l n " x l x v y - n ' i x w A y x u ' j l l q j - m m ' 2 j ' l n u u - u ' n j w m q n v d n u u - u ' n ' . < 3 8 ; ° " 4 * / j w m r ° j u x l x w ' j r w ' x " q n ~ l x v y x w w " 2 " q n n t ~ - j l " r ' n ' 2 ' x u - k u n y q j ' n ' " q j " - n y - n ' n w ' > 4 3 8 : * x o " q n l x - t l x v y x ' r ' i x w d ; 2 < f 4

Qw "qn l - ~ n w " v j - t n 2 l x - t r ' - ' n m " x v j w - g l " - n " x y y n ~ 4 T x w n " q n n ' 2 m - r w p l x - t y - x l n ' r w p 2 l x w m m - j k u n j v x - w " x o - n ' m - n ' j - n y - x m - l n m # J - n " x " q n u x ° p - j w - u v n ° x o " q n - n ' m - n ' 2 " q n k ° 3 y - x m - l " x k " j r w m m . j k x - " 8 6 * / j - n w x " - ' - r ' j k u n a ~ l x w " n w ' i x w j u l x - t j y y u l j " i x w ' j w m 2 a ~ " q r ' - n j ' x w 2 " q n ° j - n j y y u m m r w x " q n ~

j -n j ' 2' - l q j ' l x - t y j " n v n w 2 r w - u j " i x w y j w n u 2 l x v y x ' r ' n ' 2 j w m j ' l x - t u n ~ r w j p p u v n - j " n m ° r w n " x y y n ~ d = f 4 T n " n ~ q n n ' 2 r ' l j w k n l x w m m - n m j ' - ' j r w j k u n v j " n - t j u ' r w l n r " x - p r w r ' j " n p n " j k u n x w n 2 j w m r " m p - j n j " i x w n x n ' w x " p n w n - j " n v d - x y u j ' d ' d f 4

Yux° p-x° "q j w m m " n u x y v n w " x o " q n l x - t k j - t j w m " q n p u k j u " j " i x w ° r w n " - j m n w l x - j p n m " q n y - x m - l " i x w x o w n ° " ° y n ' x o " x y y n ~ d : f 4 l x - t 3 k j ' n m v j " n - t j u q j " n k n n w m " n u x y n n 2 j ' ° n u u j ' l x v y x ' r ' n v j " n - t j u ° q d l l x v k r w n l x - t j w m " q n r - k ° 3 y - x m - l " ° r ' q j n q n ' r ' n j w m w j - j u k n ~ d 7 6 f 4 n ' n l x v y x ' r ' n l x - u m k n n v y u x ° n m j ' ° r w n " x y y n ~ 2 ° q d l l x - u m k n l x w m m - n m n l x 3 o - m w m f v j " n - t j u d 7 7 f 4

I x-t j p p u v n - j " n m " x y y n ~ j - n x k " j r w m m o - x v " q n l x - t r w p y - x l n ' j ' p - j w - u j " n m l x - t 4 G ' j w j - j u k n - 2 k j v k x x " j w m l x - " j w m r ' r ' - ' n m j ' - n r w x - l n v n w ' x ~ u n - r w l x v y x ' r ' n v j " n - t j u d 7 8 f 4 H j v k x x k n ~ q j " n j ' r v n j ~ l x v y x ' r ' i x w " x j l x - t ' r w l n r ' l x w ' j r w u p w w 2 l n u u - u ' n 2 q n v d n u u - u ' n 2 j w m n t ~ - j l " r ' n ' 4 n ° q j " n k n n w - ' n m r w " n t ~ n m 2 y j y n - 2 l x w ~ - l " i x w 2 y l l t j p n 2 j w m q n j u q l j - n j - n j ' 2 m - n " x j m j w j p n ' - l q j ' u x ° n m w ' r ° 2 u x ° l x " 2 q p p q v n l q j w l j u " - n w p " q 2 ' r w n ' 2 j w m j w r 3 k j l " n - t j u j w r 3 [] 2 j w m j w r " j " d y - x y n ~ m ' d 7 9 f 4

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Xnpj nwp l xv yx' r'n' n-rwax-l nm° r'q kjv kxx kn-2 r' l jw kn qppqpq' nm "qj" yx' u' l' d' j l m. VRG/ 'j v yu' n-rwax-l nm° r'q t nwj o j w m k j v k x x k n-2 y-n' n w' n m q p p q ' n w' n u ' ' n w p' q j w m ' r' w n' l x v y j n m ' x ' r w p u 3 k n- l x v y x' r' n' d 7: f 4 G p p u v n- j " n m y x u - n' q j w n 3 k j v k x x k n-2 ' j v y u' y- n' n w' n m m- l " n u k n q j " i x ~ - w m - l x v y- n' ' r' n a- l n' 2 j w m " q n " y- n' n w' n m u a ° ' o n u r w p 5 ° j " n- j k' x- y' i x w l j y j l r ° A " q n " j- n' ' r' j k u n a ~ w x w 3 " ~ l " - j u j y y u l j " i x w' d 7; f 4

Npqq3mw' r° yx' u' n' q° u n w n 3 r' j u l x- t ' j v y u' ° n- n y- x m- l n m k ° n ± ~ ' i x w 2 j w m r ° ° j' x k' n ~ n m " q j " " q n k n " v n l q j w d j u y n- a ~ v j w l n ° ° j' x k' j r w m - ' r w p 8 * x o v j u n d j w q ° n m m j ' j l x- y u w p j p n w' 4 Q v j m m' i x w 2 q p p q 3 m w' r ° y x' u' n' q° u n w n 3 l x w- " 3 x- t n ± ~ - m m ' j v y u' j u x y- n' n w' n m r v y- x " n m v n l q j w d j u y- x y n- m' ° r' q " q n j m m' i x w x o " q n l x- y u w p j p n w' 2 k- " j u x 2 " q n y- n' n w l n x o 7 6 * x o l x l x w- " k n-2 o- w l " i x w j ' n- r w a x- l n v n w' r w " q n l x v y x' r' n' d 7 < f 4

Gppuv n- j " n m v j " n- t j u k j' n m x w l x- t 2 k j v k x x k n-2 j w m j w j m q n' r' n 2' - l q j ' u' " n ± 2 l x- u m k n y x " n w' i j u l x v y x' r' n " " x y y n- 2 k n' m m' k n r w p n w' r- x w n w' j u l o- m m w n l 4 - ' 2 " q r' ° x- t j r v ' " x m " n u x y j l x- t 3 k j v k x x 3 j " n ± l x v y x' r' n j w m " x n " j u- j " n " q n r w- n j l " i x w k n ° ° n n w " q- n n l x v y x' r' n r w- n- q l n' j' ° n u j ' " q n r- v n l q j w d j u y- x y n- m' " x y- x m- l n j w j u n- w j " r' n v j " n- t j u " x ° r w n " x y y n- 4

2. MATERIALS AND METHOD

S j "n-tj u

n l x v n- l t j u j p p u v n- j " n m l x- t . / ° r' q j w j " n- j p n y j ~ d u n' r ° n . x o 7 3 8 / v v ° j ' ' - y y u m m k ° R x p l x- t . V x ~ - p j u 4 X j ° k j v k x x . H j v k- j ' " - p j - t 2 L H / ° j ' x k' j r w m o x v " q n l x- n' " Q " r- " n x o " q n X- j u L n m- j u [w' n- r ° x o X i x m H w r- x . Y n- x y m l j 2 H j ° n / 4 O ° j ' y n n u m 2 y- n' n n 2 j w m l ~ ' q n m # V- n 3' - d j w p ° n m T X R j " n ± . R Z / 2- ' n m j ' j n q n' r' n 2 ° j' m x w j " n m k ° " q n Y j " n [w' n- r ° x o X i x m H w r- x . H j ° n / 4 n ° r w n .] / n v y u ° n m j " q n r v v n- 2 i x w " n " ° j' k j' n m x w j w [~ p- j ° j w ° r w n y- x m- l n m o x v Z j w w j " p- j y n' . I x w l q j Z x- x 2 8 6 7 ; / 4 Q v j m m' i x w 2 ' x u m . X S / j w m j p p u v n- j " n m . / - ' n m ° r w n " x y y n- 2 l x u n l " n m j ' m' l j - m m v j " n- t j u o x v u l j u l x v v n- l n 2 ° n- n j u x n v y u ° n m j w m l q j - j l " n- t ° n m " x l x v y j- n " q n v " x " q n j p p u v n- j " n m " r- p r w l x v v n- l t j u " x y y n- . X] / 2 x k' j r w m m w " q n u l j u l x v v n- l n 2 j w m " x l x v y j- n " x " q n y- x m- l n m l x v y x' r' n " x y y n- r w " q r' ° x- t 4

I x v y x' r' n v j w- q l " - r w p

n- j ° v j " n- t j u ° n- n m m m j " = 6 I x " n- w p q " k n o x- n o ~ q n ~ " n j " v n w " 4 n ° ° n- n v r t n m j l l x- m w p " x " q n - n' y n l " r " n j v x- w " @ ; * x o l x- t 2 9 ; * x o k j v k x x 2 j w m 9 6 * x o u " n ± 4 n l x v y x' r' n ° j' v n l q j w d j u l y- n 3 v r t n m . L r' j " x v / a ~ 7 ; v r w j w m l x v y- n' i x w 3 v x u m m v j w- j u l r w p j ' v x u n " x y- x m- l n l ° u r w m l j u' j v y u' . 7 ? ± 8 : v v / 4 n " x y y n- j y- x m- l n m . I S V / ° n- n " q n w m m m j w m l - x' i u w t n m r w " q n x " n w . n z - r y v n w " L G T K S / j " 7 7 6 I a ~ : > q 4 n p j ' v x u n ° n- n v j w- j u l m' l j - m m 2 j w m " q n " j v y u' ° n- n l x w m' i x w m m j " x x v " n v y n- j " - n r w j m' d l j " x- 4

Q v n- j i x w Z n' "

n l x v n- l t j u j p p u v n- j " n m l x- t . / j w m " q n l x- t 3 k j v k x x 3 j " n ± l x v y x' r' n y- x m- l n m . I S V / ' r ° n ° n- n

y- n' i x- ' u v n j ' - n m . j " n- j p n m j v n' n ~ j w m q n r p q " m v n w' i x w / " x m' n- v r w n " q n r- m w r' m' 4 ~ n ' j v y u' x o n j l q " ° y n . 7 3 j w m l S V : 3 < 2- n' y n l " r " n u / ° n- n y j ~ j u l r v v n- 2 n m r w 7 6 v R x o ° r w n . l x ~ n' y x w m r w p " x ; v v x o q n r p q " / 2 y j l n m r w j l u x' n m p j ' ' j ' t 2 j w m t n y " r w " q n ~ n o- r p n- j " x ~ a ~ ' n " n w m j ° ' 4 G n ~ " q n ~ n v x " j u x o " q n ° r w n v n m r- v 2 " q n " j v y u' ° n- n ° n r p q n n 2 j w m " q n r- m v n w' i x w ' ° n- n v n j ' - n m # n r v v n- 2 i x w " n " j r v ' " x x k' n ~ n " q n y n- v n j " i x w x o l x- t j w m k j v k x x - n' m- n' " x ° r w n j w m " q n o- w p r' y- x u m- j " i x w 4

I x v y x' r' n I q j - j l " n- t j " i x w

n l x- t 3 k j v k x x 3 j " n ± " x y y n- ° n- n j w j u ° n m k ° L x - m ~ " j w a ~ v r w o j - n m ' y n l " - x' l x y ° . L Z X / - ' r w p j w G Z X j l l n' x ° 4 n' y n l " - j ° n- n l x u n l " n m x w Y y n l " ~ v 7 6 6 . V n- t r w k w n- / r w j - j w p n x o : 6 6 6 3 < 6 6 1 v 3 j " 9 8 ' l j w ' ° r' q j - n' x u- " i x w x o : l v 3 4 n l x v y- n' i x w " n' " x w " q n l x v v n- l t j u j p p u v n- j " n m l x- t j w m " q n y- x m- l n m l x v y x' r' n " " x y y n- v j " n- t j u ° n- n y n- a ~ v n m - w' u < 6 * " - j r w r w j - w' n- j u " n " r w p v j l q r w n [S I 9 6 6 . I x w' n w l x / 4 n ' j v y u' . 7 ? ± 8 : v v / ° n- n- j m j u l l x v y- n' n m j " j l x w " j w ' - j " n x o 8 S V j 5 v r w- ' r w p j 8 6 " u j m l n u # n l x v y- n' i x w " n' " ° n- n y n- a ~ v n m r w " - y u l j " n j w m " q n " - n' 3 " - j r w j " n- j p n l - ~ n ° j' - n l x - m m " x x k' j r w b x - w p' v x m- u- 4

S d - x k r j u j w j u' r' x o " q n l x v y x' r' n

n l x- t 3 k j v k x x 3 j " n ± l x v y x' r' n y- x m- l n m ° j' l ~ ' q n m j w m m u- n m . 7 @ 6 / r w j w j z - n x- ' 6 4 * ° " 4 y n y " x w n ' x u- " i x w . y n y " x w n 7 p 5 R j w m ' x m- v l q u x- m m > 4 p 5 R ' x u- " i x w / 4 G w j u z - x " . 7 v R / x o " q r' ' x u- " i x w ° j' r w l - u j " n m x w x " q n y x " x m m ± - x ' n j p j ~ y y " n' j w m r w l - k j " n m j " 9 6 I a ~ = 8 q a ~ v x u n l j w m ° n j ' " p- x ° " q 4 G n- " q n r w l - k j " i x w y n- x n 2 l x u w p l x- w' r w p ° j' n t y- n' n m j ' " q n w- v k n- x o " j k u n l x u w m' y n- ° n p p q " x o l x- t v j " n- t j u r w p- j v ' . I L [5 p / 4

Gu j w j u' r' " q j " ° j' y n- a ~ v n m r w " - y u l j " n' ° n- n n " j u- j " n m k ° G T U] G 3 7 ° j ° j w j u' r' 2 . q l " x- (d x v y x' r' i x w A u " n u @ S V n / 2 u " n u x o ' i p w r l j w d n x o ? ; * 4 Z - t n ° " n " - n " n j u m " q n ' i p w r l j w " m r n- n w l n k n ° n n w y j r- 2 u " n u x o ' i p w r l j w d n x o ? ; * 4

3. RESULTS AND DISCUSSION

n l x- t 3 k j v k x x 3 j " n ± l x v y x' r' n y- x m- l n m q j ' j l ° u r w m l j u ' q j y n 2 m v n w' i x w " j u- n' " ° y d j u l a ~ ° r w n k x u l 2 j w m k- x ° w l x u x- j " i x w d 7 = f 4 n ° n r p q " 2 m j v n' n- 2 q n r p q " 2 j w m m w' r ° l q j w p n' " x " " x y y n- j k n o x- n j w m j n- " q n r v v n- 2 i x w " n " j - n m' y j ° n m r w Z j k n 7 4

n l x- t 3 k j v k x x 3 j " n ± l x v y x' r' n y- x m- l n m r' q n j " m- j w m m w n- " q j w l x v v n- l t j u j p p u v n- j " n m l x- t " " x y y n- 4 V- x k j k u 2 " q r' q p p q n- m w' r ° r' m- n " x " q n k j v k x x - ' n m r w " q n y- n y j - j " i x w x o " q n l x v y x' r' n ' " " x y y n- j ° q d q y- n' n w " j w j " n- j p n m w' r ° x o . 6 4 < 3 6 4- / p 5 l v ° d 7 > f 4 j r n- n w' y j ~ x o " q n l x- t l j w j u x r w - n w l n . r w l - n j' r w p x ~ m l - n j' r w p 2 m y n w m r w p x w " q n l j ' n / " q n m w' r ° x o " q n l x- t " " x y y n- d 7 ? f 4 I x- t' o x v m r n- n w " v j w- q l " - n- j l j w y- n' n w " m' r w l " m w' r' m' 4 n r w l x- y x- j " i x w x o k j v k x x y j ~ " l x- t p- j w- u i' y q ° d j u l j m q n- n m l x w' - k - " n " " x r w l - n j' n m v n l q j w d j u y- x y n- m' 2 " q x- p q " q n u p q ° n p p q " x o k j v k x x l x- u m m v r w' q " q n l x v y x' r' n m w' r ° 4 N x ° n " n- 2 " q n j m m m

Zj kun 74Vq° d j uy-xyn~m' xo"qn l xv v n-l ij u j p p u v n-j "nml x-t ' "xyyn~ . / j wny-xm-l nml xv yx' r'n . I S V / "xyyn~

Yj v yun	_ nrpq° . p/	J ij v n~n~. lv /	Nnrpq° . lv /	J nw'r° . pSl v 9/
Hnō-nō v n~rxwZn' "				
	84 8; : 64768;	74	84	64=77 6467; 7
I S V	94 > ; > 648? >>	74	84	64; 8< 64; ? >
G n~ō v n~rxwZn' "				
	84 > 9; 646 > ; 7	74	84	64? : : 6467; 9
I S V	; 47 >> 647? ; 6	74	84	64; ; 7 6469; 7

l xv yxw n w ° . k j v k x x 2 ū j " n ± / " x l x - t r w l - n j ' n m " q n ' j v y u n ' m m w ' r ° d 8 6 f 4 N x ° n " n - 2 " q n q p q n " m r n - n w l n r w " q n m m w ' r ° " j u - n r ' α - w m j n ~ " q n r v v n - l r x w " n " 2 ° q d q u j m i " x " q n l x w l u - ' r x w " q j " " q n k j v k x x l x v y x w n w ° r ' " q n q l " x ~ " q j " v x l " l x w - t k - n " " x " q n r w l - n j ' n r w " q n m m w ' r ° x o " q n l x - t " x y y n - 4

n - n i - ū j n ~ " q n r v v n - l r x w " n " r w ° r w n ' q x ° n m " q j " k x " q v j " n - r j ū . j w m I S V / y - n ' n w ' n m ° n r p q " p j r w 4 N x ° n " n - 2 x w ū " q n l x - t 3 k j v k x x 3 j " n ± l x v y x ' r ' n y - n ' n w ' n m j w r w l - n j ' n r w m j v n " n - 2 ° q n l x v v n - l i j u l x - t " " x y y n - . j w j " n - j p n m m w ' r ° x o 6 4 = 7 p S l v 9 d 8 7 f / - n ' j r w n m " q n r - ' r ° n j n ~ " n " n w n j ° x o r v v n - l r x w r w ° r w n 4 r ' x k ' n - j " i x w r ' - n n l " n m r w " q n m m w ' r ° n j " j 2 ° q d q ° n - n - j i ' r ' n m v j r w ū α ~ l x - t 3 k j v k x x 3 j " n ± ' j v y u n 4 n l x v y x ' r ' n " " x y y n - y - x m - l n m . j w j " n - j p n m m w ' r ° x o 6 4 ; 9 p S l v 9 / n ± q k r ' n m j - n j " r " n r w l - n j ' n x o 9 7 4 8 * r w m m w ' r ° j w m j ' u p q " r w l - n w r w " q n r - n j v n " n - 2 ° q n - n j " q n l x v v n - l i j u l x - t " " x y y n - y - n ' n w ' n m j w r w l - n j ' n x o < 4 < * r w m m w ' r ° 4 [- j ū 2 l x v v n - l i j u l x - t " " x y y n - j ū x y - n ' n w ° r w n j k ' x - y " i x w 2 ° q d q ° - j ū ū " j k r u ° n ' j n - v x w ' q " x o l x w ' j l " ° r ' q " q n u z - m . 9 3 8 : v x w ' q / j w m r ° ° x - u m k n " q n - n i - ū x o v d - x l j y r u j - r ° x - n " j y x - j " i x w 3 x w m m w ' j " i x w y q n w x v n w j d 8 8 f 4

Z - t n ° " n " ° j ' - n m " x " n - r ° r o " q n - n r ' j m r n - n w l n ' " j " r ' d j ū ū ' i p w r l j w ' k n ° n n w k x " q l x - t ' n v y u x ° n m r w " q r ' " - n i j n x y - r w p ? ; * x o l x w m m l n 4 r ' " n " r w n l j " n m " q j " " q n - n r ' j ' i p w r l j w ' m r n - n w l n k n ° n n w " q n ° r w n j k ' x - y " i x w . ' ° n u r w p r w " q n v n m j . ° r w n / ° x v " " x y y n - j w m " q n I S V ' j v y u n ' . y B 6 4 ; / d ; f 4 r ' v n j - - n v n w ' - p p n ' " " q j " " q n - n ° j ' j p - n j " n ~ v i p - j " i x w x o ° r w n " x " q n l x - t 3 k j v k x x 3 ū j " n ± l x v y x ' r ' n y - x m - l n m r w l x v y j - r ' x w ° r ' q " q n l x v v n - l i j u j p p u v n - j " n m l x - t 4 r ' v j ° k n - n j " n m " x " q n j - - x v j " d l x v y - n ' i x w 3 x u m m y - x l n ' " x o " q n l x v v n - l i j u j p p u v n - j " n m " " x y y n - 2 ° q n - n " q n - n r ' r v y - x " n m l x - t y j l t j p r w 4 U w " q n x " q n ~ q j w n 2 " q n l x v y x ' r ' n ' y - x m - l n m ° n - n l x v y - n ' n n 3 x u m m v j w - j ū ū ° q d q v j t n ' r " m r l - ū " x l x w - x u " q n y j - d i n y j l t j p r w 4 H i ' m m ' " q j " 2 " q n - n j - n " q n r w - r w d l y - x y n - m ' x o l x - t j w n k j v k x x 2 ° q n - n l x - t l j w k n l x w m m - n m j q ° m x y q x k d v j " n - j ū ū q n - n " q n y - n ' n w l n x o j q ° m x y q n d v j " n - j ū ū - l q j ' k j v k x x - n ' m - n 2 j p p - n j " n m " x r ' 2 l x - u m r w l - n j ' n " q n j k ' x - y " i x w x o - m i - d q r w 3 U N p - x - y ' 2 - l q j ' ° r w n d 8 9 f 4 l x - t j k ' x - k ' ° r w n r ' - n j " n m " x " q n - m m r - l - r w " - x - p q " q n l x - t ' l n u ° j ū ū q n - n " q n m r " r w p α - l n r ' " q n l x w l n w ' - j " i x w p - j m m w ' d 8 7 f 4

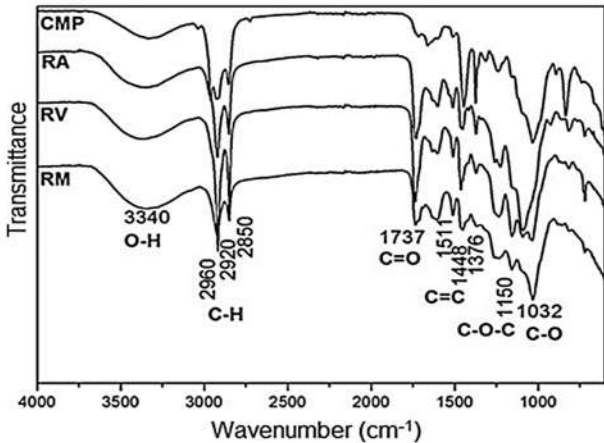
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l x - t " " x y y n - r ' q x ° w r w L p 4 7 4 r ' l x v y j - r ' x w j r v ' " x ' q x ° " q j " " q n l x v v n - l i j u j " j n j k u n l x - t ' q j " n j ' r v n j ~ y - x u 2 " q n ° y - n ' n w " q n ' j v n v j r w L Z O X k j w n i x o " q n l x - t 3 k j v k x x 3 j " n ± l x v y x ' r ' n y - x m - l n m 2 r w n l j " r w p " q j " " q n l x - t y q j ' n r ' m x v r w j w 4 L p 4 7 ' q x ° ' k j w n i j " 9 9 : 6 l v 3 l q j - j l " n - r ' d l ' x o U N k x w m w p x o " q n l x - t 4 ° q d q l x w ' j r w U N k x w n i r w " q n r - " - l " - n d : f 4 H j w n i o x v 8 ? < 6 " x 8 > ; 6 l v 3 l j w k n j - r k - " n m " x " q n I N 8 " i k - j " i x w x o " q n l j - k x w l q j r w y - n ' n w ' r w l x - t l x v y x w n w ° d 8 : f 4

Nx ° n " n - 2 x w ū " q n l x - t 3 k j v k x x 3 j " n ± l x v y x ' r ' n " " x y y n - ' q x ° n m j k j w m j " 8 ? < 6 l v 3 j w m j ' u p q " m r ' y ū l n v n w ' x o " q n l 3 N k j w n i " x 8 : 8 8 j w m 8 > ; 9 l v 3 4 r ' n " m m w ' k j w m v j ° k n - n j " n m " x " q n l 3 N " - n l q r w p " i k - j " i x w . I N 8 / x o ū j " n ± ° q d q r ' " q n x w ū m r n - n w " l x v y x w n w ° l x v y j - n m " x " q n x " q n ~ ' j v y u n 4 n ' q r l j w k n j ' l x l j " n m ° r ' q " q n l x v y x ' r ' i x w ' r w l n r ' y - n ' n w " l x - t 2 k j v k x x 2 j w m ū j " n ± 4 L - ~ " q n - v x - n 2 r ' l x - u m k n m - n " x ° j " n - j k ' x - y " i x w - n j " n m " x " q n v j w - j u v j w - g l " - r w p y - x l n ' 2 ° q d q l x w - r k - " n m " x k j w n i k - x j m m w r w p 4 H j w n i j " 7 = 9 < l v 3 j - n - n j " n m " x " q n l j - k x w p u p - x - y o x v ' - k n - r w 4 Y x v n k j w n i . 7 < 7 = 2 7 ; 7 7 2 j w m 7 : : > l v 3 / ° n - n j - r k - " n m " x I C I j - x v j " d - r w p " - n l q n ' 4 n k j w m j " 7 9 = < l v 3 r ' j l - r k n m " x U 3 N r w 3 ū j w n m m x - v j " i x w r w y x ū y q n w x ū v j r w ū o x v u p w w d 8 ; f 4 n 7 7 ; 6 l v 3 j k ' x - y " i x w k j w m r ' j ' l x l j " n m ° r ' q " q n " - n l q r w p " i k - j " i x w x o l 3 U 3 k x w n i l q j - j l " n - r ' d l x o " q n y x ū j l l q j - m m ' ° r ' q 7 : p ū l x ' m l u w t j p n . l n u - u x ' n j w m q n v d n u - u x ' n l x v y x - w n i / d 8 < f 4 U " q n - k j w n i . 7 7 8 : j w m 7 6 ; 9 l v 3 / j - n j ū x j - r k - " n m " x " q n I 3 U 3 k x w n 2 ° q d q l x - u m k n y - n ' n w " r w " q n L Z O X ' y n l " j x o ' j v y u n ' 2 q x ° n " n - 2 m - n " x " q n k - x j m m w r w p k j w n 2 " q n ' n k j w n i l x - u m k n x " n - j y y n m 4 n - n p i x w o x v > : 6 " x = 8 6 l v 3 l j w k n j ' l x l j " n m ° r ' q - r w p " i k - j " i x w ' . I 3 N x - " x o " q n y ū w n j w m r w 3 ū j w n k n w m w p / x o " q n u p w w d 8 : f 4 n q r p q n " m r n - n w l n α - w m r w " q n l x v y x ' r ' n 3 y - x m - l n m ' y n l " ~ v ° j " " q n n " m m w ' k j w m j " 8 ? < 6 l v 3 j w m " q n u x ° r w ' n w ' r ° x o " q n I C U k j w m j " 7 = 9 = l v 3 4

Zx j w j ū ° n " q n - n u j ' n x o l x - t 2 k j v k x x 2 j w m ū j " n ± - n ' m - n ' o x v " q n l x v y x ' r ' n y - x m - l n m " x " q n ° r w n j n ~ " q n r v v n - l r x w " n " 2 j w L Z O X j w j ū ' r ' x o n j l q l x v y x w n w ' . L p 4 8 j / j w m ° r w n k n x - n j w m j n ~ " q n r v v n - l r x w " n " . L p 4 8 k / ° j ' y n - α - v n n 4 L p 4 8 j ' q x ° ' " q j " " q n l x v y x w n w ° x o " q n l x v y x ' r ' n y - x m - l n m y - n ' n w " q n ' j v n k j w n i y - n ' r x - ū ū l r ' n n 4 G " " x w p j k ' x - y " i x w k j w m j " 9 9 ; = l v 3 r ' j l - r k n m " x q ° m x p n w 3 k x w m m U 3 N x ~ T 3 N 4 O r ' ° x ~ q w x " r w p " q j " " q n ū j " n ± ' y n l " ~ v n ± q k r " j k j w m r w 8 ? < 6 l v 3 2 " q n ' j v n x w n α - w m r w " q n l x - t 3 k j v k x x 3 j " n ± l x v y x ' r ' n 4 r ' k j w m r ' l q j - j l " n - r ' d l x o " q n j ' ° v v n " - d " - n l q r w p

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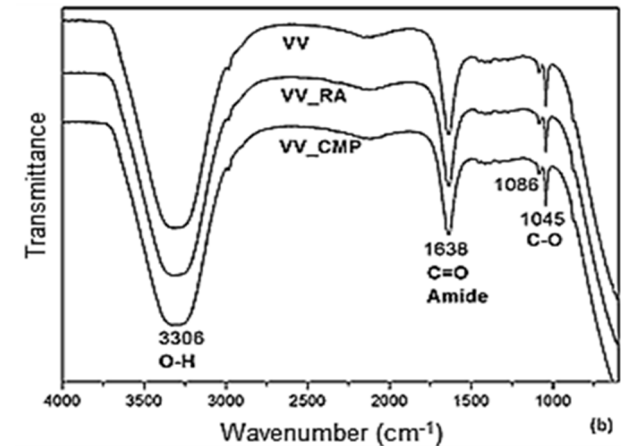
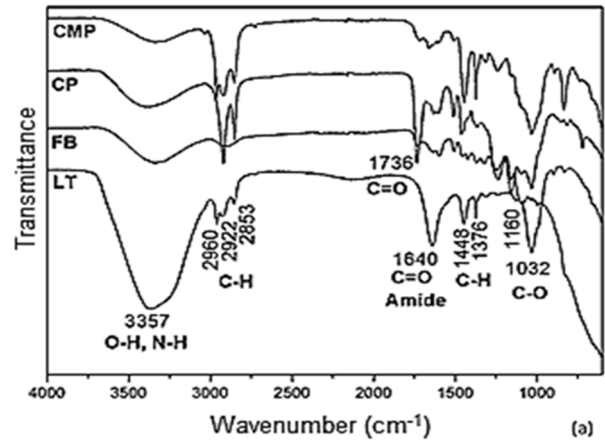
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r' -npxw rwl u-nm' "n'l qrw p "ik-j "ixw xol 3U2I 3T2 I 3N2I 3 2T 3N n I CU kxwm ° qd q j-n " ydl juxomr n-nw' v xul-un' y-n' nw' rw ° rwn d96f4 LZOX jwj u' r' 'qx° nm 'rv nj ~kjwm y-x unx-j u' jv yu' n' nwj n~ "qn rv v n~lxw "n"4 n-n° j' wx v xmr lj "ixw xo "qn 'ynl "j 2nr "qn-k° "qn y-n' nwl n x~jk' nwl n xoj kjwm x~k° kjwm m' yuj lv nw' 4 Gyyj -nw' u' 2 "qn-n° j' wx l xv yxw n' -nuj 'n xo "qn lx-t 3 kjv kxx 3j "nt l xv yx' r'n y-xm-l nm "x "qn v nmj . ° rwn/4

n v nlqj wdl juyn-ox-v j wln xo "qn lx-t "xyyn-° j' " -mmmk° l xv y-n' r'n nty-n-iv nw' 2Lp49 . 7 l -2° n xonjl q "ayulj "n r' 'qx° w/4 n l xv y-n' r'n knqj "ix~ -n' yxw n xol x-t "xyyn-° ljwkn m' mmmrw' x "q-n -npxw' @ "qn -° -npxw . -y "x =4 * "j rw/2° qd q r' jw nj "dl j-nj lx~n' yxw n' w' x "qn-n' n~tkun knw n' w' p xo "qn v j "n-tj uA "qn 'nlxwm -npxw . -y "x 9; * "j rw/2° qn-n "qn-n r' u' -pn yuj "nj -lx~n' yxw n' w' x nuxwpj "ixw xo "qn v j "n-tj uA j wn2 "qn u' "xw n2° qn-n "qn-n r' j l xv yj l "ixw -npxw l qj-jl "n-t° nmk° jw jk~y " rwl-nj 'n rw "j rw ° qnw l-t "dl ju "n' r' -nj l qnm d97f4

n lx-t 3kj v kxx 3j "nt l xv yx' r'n "xyyn-° m' yuj ° j wwl-nj 'n rw bx-wp' v xm-u' . oxv 6499 S Vj . / "x 649= S Vj . I S V / / ° qnw l xv yj -nm ° r' q l xv v n-lj u' jppuxv n-j "nm lx-t . yB64; /4 Nipqn~ nj "dl v xm-u' rwm l j "n "qj " "qn y-xm-l nm l xv yx' r'n "xyyn-° -yxx-° j qpqn-ukj m "x -nj l q <6* xo mmx~v j "ixw unj mwp "x jw rwl-nj 'n rw "qn 'r wn' 4 r' rwl-nj 'n rw bx-wp' v xm-u' lx-um kn j ux -nj "nm "x "qn qpqn- mmw r' ° xo "qn lx-t 3 kjv kxx 3j "nt l xv yx' r'n rwl xv yj -t' xw° r' q "qn l xv v n-lj u' jppuxv n-j "n lx-t "xyyn-4 I x-t v rpq° kn yq° dl ju

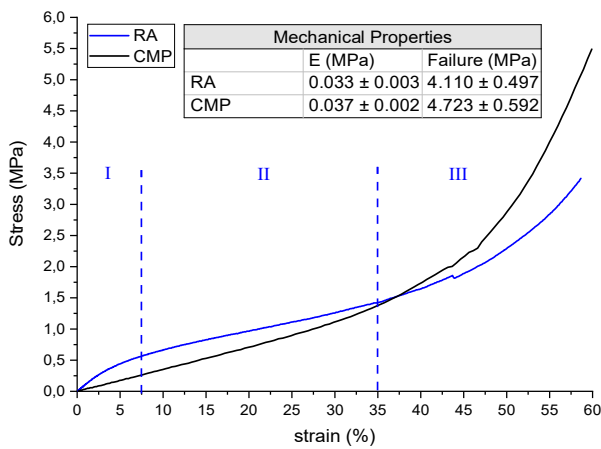
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Lp484 LZOX 'ynl "j xo "qn @j / rwn' m-a-j ul xv yxw n' jwm lx-t 3kj v kxx 3j "nt . I S V / l xv yx' r'n y-xm-l nm . j' ° nuuj' kjv kxx kn~ RAH2j "nt RZ2l x-t RAI V / jwm . k / ° rwn j n~ rv v n~lxw "n" xo h] . jppuxv n-j "nm lx-t / jwm I S Vh] . lx-t 3kj v kxx 3j "nt l xv yx' r'n lx-t / A° rwn knox-n "qn "n" RA] /4

S dl-xkj u j wj u' r' xo v xum jwm ° nj "° rw "qn l xv yx' r'n y-n' nw' nm74 ± 76° I L [5p . l xv u w 3x~v rw -w' yn-p-j v / rwm l j "rwp "qn v dl-x-pj w' v ' y-n' nwl n2° qd q r' -wm r-j kun n' nw rw ux° l xv nw' -j "ixw 4G yx' r' ikun -nj 'xw ox~ "qn mm" nxyv nw' xo v xum ljw kn -nj "nm "x q-v m' ° y-n' nw' rw "qn l xv yx' r'n m-n "x yxx-n l mw° rw "qn m° rwp y-xl n' 2 -npj -mwp r' "rv n jwm "nv y-nj " -n d7<2 99f4 Qv j nm "ixw 2 "qn kjv kxx q° mxy qnd r' ° lx-um l xv -tk- "n "x v dl-x-pj w' v ' -y-x-ucn-j "ixw d9: f4 Uwn xo "qn "nj "v nw' y-n' ix-° u' j nxy "nm "x y-n' nw' "qn y-x-ucn-j "ixw xo -wpr ° j'

lqx-rwj "ixw4 Nx° n"n-2 ro "qn ° j' qrpw jwm 'n-ru°j "ixw y-xln' ° j' wx ° nuyn-α-v nn2 "qn-n ° j' "qn α-v j "ixwxo -wmm' r-j kun lqx-xyqnxwx l xv yx-wm4 n'n l xv yx-wm1 yn-v nj "n "qn lx-t 2 lj-rwp j" x~ -wyuj' jw° jwm l xv y-xv r' rwp "qn ° rwn z-jru° 4Lx~ "qr' -nj' xw2wx° jmj' ° 2 "qr' "nj "v nw° r' l xv yun' nu' α-kmmw rw lx-t 3 "xyyn~ v jw-gj l "rwpy-xln' n' d9; f4[wox~ -wj "nu' 2 "qn v -' ° jwm v xun' j" x~ rw ° rwn r' j' xlj "nm° r' q "qn lx-t "xyyn~ 2 ° qd q ° x-umkn j' xlj "nm° r' q lx-t -' 82 23~ dl qux-xjw' xun4 Gw' xun' j-n -nj "nm "x j "uj' " >6* xolx-t "jrw d9<f4G yx' ' ikun -x-n "x lqjw p v dl -xx-pjw' v p-x° "q lx-umkn -nj "nm "x '-gjl n "nj "v nw° k° yj' v j -nj "ixw d88f4 Hj° rujw unpr' ij "ixw nx wx° rlu-nm v dl -xkixupdju yj-jv n'n~ α~ lx-t "xyyn~ "qnv' nu' n' 2 k- "qn v dl -xkixupdju yj-jv n'n~ ' qx-um -nj lq "qn xwn' α~ "qn αxm rlxw' j l ° r' q "qn yjlt j prwp 2XJ I w478567 d9=f4



Lrp4 94 I xv y-n' r'n y-xyn~m' xo "qn lxv v n-lj u jppuxv n-j "nmlx-t . / jwmlx-t 3kjv kxx3j "nt lxv yx' r'n "xyyn~. I S V/ -wru<6* mnx-v j "ixw4

4. CONCLUSIONS

Ø ° j' yx' ' ikun "x y-xm-l n j lx-t 3kjv kxx3j "nt lxv yx' r'n "xyyn~ "qj " ntqkr" y-xyn~m' ' rv nj~ "x lxv v n-lj u jppuxv n-j "n lx-t 4Ø ° j' xk' n~nm "qj "qn-n ° j' wx v ipj "ixwxo "qnl xv yxwvw" -' nmrw "qnl xv yx' r'né gk-dj "ixw. lx-t 2kjv kxx2x~ij "nt/ α~ "qn ° rwn2j' ° nuuj' "qn-n ° j' wx "r' ikun r'n-j l "ixwkn° nno° rwn jwml xv yx' r'n xk' n~nmk° LZØ4Ø ° j' j úx xk' n~nm "qj "qn lxv yx' r'n y-xm-l nm° j' yq° dl j u' jppuxv n-j "nmj wmntqkr "nmj pxxm j nqn' ixw xoj uil xv yxwvw" 4 -x-pqx- "qn rv v n~lxw "n 2 r' ° j' yx' ' ikun "x "n-rd "qn y-n' nwl n xov xun' jwm° nj' "° rw "qn lxv yx' r'n 2 n' nw rw uk° jv x-w" 4 n lxv yx' r'n y-xm-l nmy-n' nw' nmv nl qj wdl j uy-xyn~m' '-r' j kun α~ "qn jyyul j "ixw xo ° rwn "xyyn~ 4 Nx° n" n- ' r' n- "qj w lxv v n-lj u "xyyn~ 2 "qr' onj "n ljw kn yx' r' r'n rw "qn ' nj urwp y-xln' 4Ø r' l xw mm-nm "qj "qn lx-t 3kjv kxx3j "nt lxv yx' r'n y-n' mw" j yx' nw' ij uj' j w j un-wj "r" n v j "n-j u "x ° rwn "xyyn~ r' l n "qn' -k' r' "ixw xoyj ~ xo "qn lx-t ° r' q kjv kxx lx-um-nm-l n r' -' n j w m "qn lx' "xo "qn v j "n-j új' ° nuuj' ' ' rv -ij "n "qn y-xm-l "ixw xoj '-' j w j kun v j "n-j új Ø r' ° x~q v nw' ixw wwp "qj "o~ "qn~m' nuxyv nw' r' -nz -r-nm "x j "xmv xun j w m° nj' " p-x° "q4

AUTHOR INFORMATION

I x ~n' yxw mwp G- "qx~ Økv j ru@nwj "j w-wi' 4-o-sF pv j n4 xv

UXI Q

Gurl n Yxj -n' H-r"x @666366683? 7=379: =
 Nj ~r' xwRx -nw x I x~ j @666366673 =6636; =?
 P-j -n°] dl nw'n @666366683 9: 63<=9;
 I -r' "ij wn Nn' ' mm G° n' nmx S nur-x @666366673=88837>6:
 Gunj wmn S rp-nunx Tj' l rv nw' x @666366673 9: =3; =
 Xnwj "j T -wn' Uur' nr-j @666366673 =>838<? a

ACKNOWLEDGMENTS

n j - "qx~ j l t wx° unpn I KZKS 5[LXP j wml T V24 K' "n n' -nx oxr wj w l rj nx ynj LGVKXPRA-wnj x I j -xk' I qj pj' Lnuq nm Gv yj -x Vn' z-r' j nx K' "j nx nx Xrx nm Bj wnr-x 2 V-xln' x YKOK38<58674>758687 .8<6; 98/4 r' " -m' ° j' wj w l nm rw yj ~ k° "qn I xx-mwj x nm Gyn-qr xjv nw' x mm Vn' ' xj u mm T "nu Y-yn-ix~ RAH-j' nu . I GVKY/ RA rj w l n I xmm 6674

REFERENCES

d7f GVI UX2 í l x-t Øα-v j "ixw H-nj -2 G' x l 4 Vx~4 I x~r' j 2 "xut 72 wx4 72 yy4 7RØ 867? 2 dUwuwf4 G" j nj kun@ q y' @5° ° ° 4ylx-4 "5° y3 l xw' nw' 5-yux j m' 5867? 568SI UXZO G3Xxuj' 3m3 I x~r' j hVZ4m4
 d8f N4 Vn-nr-j 2 I x-t @Hxup° 2 V-xm-l "ixw j wml ' n' 27" "nm4Kun" m-Yl mwl n2866=4
 d9f G4Rj px-l nZj l qxw2Z4Qj -kx° ij t 2J 4I qj v yxw2X4 J 4Mx-pnxw2j wml PØV4Hnuj "2iS nl qj wdl j uy-xyn~m' xolx-t @K nl "x oq° mj "ixw2 S j ' n-4J n' 2" xut >82yy4 7: >RØ; 2 Ul "4 867; 2 mxr@ 76467<5 s4 j "m' 467; 4; 49: 4
 d: f I 4] nuj 2G4L4Yx~' j 2l 4Y4X4L-nr-n2G4P4J 4Yru' n' -n2 j wml 4Vj' l xj u T n' x 2i T x" nu' -' "j rwj kun lxv yx' r'n' y-nyj -nm oxv lx-t -n' m-n' jwm kixyxúv n~2 Hxv j ' ' j wml Hxwnp~2" xut ; 2yy47: >RØ; 2 G-p4 86792nxr@Ø6467<5s4kxv kixn4679467468? 4
 d; f K4S 4Ln-wj wml 2] 4S 4I x~nux 2P4G4S 4I qj pj' 2P4L4 S j wx2 j wml X4 R4 Xnr' 2 i V-xyn~m' xo wn° lx-t R4xúv n~lxv yx' r'n' @m' j w' pn' j wmmj° kjl t' j' l xv yj -nm° r' q lxv v n-lj u j "nj kun k-nkxj -m v j "n-j új 2 I xv yx' 4Y~ -I 2P-w486772nxr@Ø6467<5 s4 xv y' ~ -I "46774<46864
 d<f Y4V4 Yru' j 2 S 4 G4 Yj krxw2 K4 S 4 Ln-wj wml 2] 4 S 4 I x~nux 2R4L4Hkn' nu2j wml X4R4Xnr' 2i I x-t @-xyn~m' 2 lj yj kru' m' j wmj yj u j "ixw 2 Ø' 4S j ' n-4Xn' 2" xut; 62 wx4 <2 yy4 9: ; RØ; 2 J nl4 866; 2 nxr@ 76477? =57=; 98>66; a : 77<>4
 d=f Y4V4S j pj uq n' nj Yru' j 2V4Y4Rrv j 2j wml P4S 4Uur' nr-j 2 í Xqnx upd j u knqj "ix~ xo lx-t 3yxúv n~lxv yx' r'n' α~ rwnl "ixw v x-umwp2 I xv yx' 4Vj ~ HKwp2" xut? 62 yy4 7=8R7=>2 Gy-4 867<2 mxr@ 76467<5 s4 xv yx' r'n' k467; 48467; 4
 d>f P4 G° n' nmx 2 V4 Rxy n' 2 T 4 S j "n- 2 j wml] 4 mm L-nr' j 2 í l x-t 2j Tj " -j ul qxd n "x _ rwnE2 Lxxni2" xut 772wx4 7=2y48<9>2G-p486882nxr@Ø6499? 65αxm 777=8<9>4

d8f K4S 4Ln-wj wmm'2] 4S 4I x~nuX2P4L4S j wx2j wmx4R4
Xnr'2 iI x-t Ryxuv n~ kx1xv yx' r'n'@ S nl qj wlj ul
'~l' -j u j w m "qn-v juy-xyn-'m'2 Sj "n-4J n'2" xuf
>82 yy4 8>8R8>?2 U1 "4 867; 2 nrx@ 764767<5
s4 j "m'467; 46; 46: 64

d76f R4 Mn2 iI x-t I xv yx' r'n' @ G Xn"mo 2 Sj "n-4j u
. Hf 'nu'2" xuf 82 wx 492 yy4 ==<RA>? 2 P-t4 866? 2 nrx@
76499? 65v j 8696==<4

d77f P4 Ym~j 3V -n'2 G R4 Lx-wr '2 P4 Hk' l qv xwj "3Xr' n' 2
j w m a 4 Mj kj ~nu2 i n yx "nw' rju j yjul j "xw' xo
nl x3v j "n-4j u nw rv y-x" rwp '- ' j rwj kru' rw k-nmwp' @
"qn lj' n xo lx-t 2 P-t4 867<2 yy4 7<? RA>62 nrx@
7648: ?; 5GX1 7<67; 74

d78f R4Dj wp2b4Rt2l 4a xwp2j wmmY4Y-2iV-nyj -j "xw j w m
l qj -j l "n-4j "xw xo j wx" nu mp-j nj kun wj wx3
q' m x s' j yj "r'n5yxu. ul "d 3 lx 3p l xul / l xv yx' r'n
~nrwx-l nm' r' q kj v kxx kn-2 Sj "n-4Yl r4Kwp4l 2" xuf
=; 2 yy4 767: R767>2 P-w4 867=2 nrx@ 764767<5
s4 ' nl 467=46946: <4

d79f V4c j t t qj w2X4c j qj -r2S 4Z4N4Y-uj w2j w m J 4R4
S j sm2i Kt' -j l "xw j w m y-nyj -j "xw xo kj v kxx k-n3
~nrwx-l nm l xv yx' r'n' 2 Sj "n-4J n' 2" xuf <92yy4>86RA
>8>2Tx" 4867: 2nrx@ 64767<5s4 j "m'467: 46<46; >4

d7: f X4H4b -x 2N4Zj t j pr2j w m G4T 4T j t j p j r' x2i Znw nun
j w m n~ -j u y-xyn-'m' xoyx ul ul "d j l m k j' nm q' k-m
p-nmw l xv yx' r'n' ~nrwx-l nm k' t n w j e k j v kxx j w m
l x r~ kn-2 Gm#I xy' V-xn2" xuf?: 2yy4; <8RA>92
J nl 4867<2nrx@ 64767<5s4 w l -xy 467<46? 467=4

d7; f S 4 R4 Y wl qn' 2 R4 b4 S x-j u n' 2 j w m P4 J 4 I j d nm x2
i Vq' d j u j w m v nl qj w l j u y-xyn-'m' x o j p p u v n-j "nm
y j w u l v j m o x v k j v kxx kn~j w m "n p n' j kun -n' r w 2
I x w "4 H-rm# Sj "n-2" xuf 7; <2 yy4 996R99? 2 J nl 4
867=2nrx@ 64767<5s4 x w k-nm v j "467=46? 4694

d7<f K4 S 4 Ln-wj wmm'2] 4 S 4 I x~nuX2 P4 L4 S j wx2
j w m X4 R4 Xnr' 2 i Vxuf y-xyo unw3kj' nm l x-t Ryxuv n~
l xv yx' r'n' @V-xl n' rwp yj -j v n' n' j w m y-xyn-'m' 2
I xv yx' 4Vj ~HKwp2" xuf <2yy4876R8892Tx" 4867: 2
nrx@ 64767<5s4 xv yx' r'n' k467: 46; 467: 4

d7=f G4l 4j nj 2P4Hk' l qv xwj "3Xr' n' 2Y4Mkw' u' 3Mj -l j 2
S 4j nv n~ r2a 4Mj kj ~nu2j w m R4G~x s j 2i Gw j u' r' xo
-j o l x-t y-xm-l "xw rw Vx~ -p j u j w m l j "j u w j -' rwp
u n l o l u n j ' n' v n w 2 O' 4P4Rm l ' l u n G' n' 2" xuf 7? 2
wx 4 782 yy4 7? >; R86662 J nl 4 867: 2 nrx@ 764766=5
' 779<=367: 36>673=4

d7>f X4Y4Hn-wm n w 2X4P4Qr' t n 2J 4I 4Hj "r" j 2K4S 4nx
Tj ' l v n w' x 2 j w m L4 U' "j yr" 2 i XKYQZ TI G
LRKa U KYZ Z Q G K I US VXKYU
VG RKR G J U HGS H[3S UYY . Vq' u x' j l q' '
y-kn' l n w / 2 LRUXKYZG" xuf: 92wx 492yy4: >; R4: 2
86794

d7? f] 4Uu' n-r j w m N4Vn-nr-j 2i I x-t j w m l x-t Yxyyn-@
W-j u' j w m Vn-x~v j w l n2 rw I q n v r' "s j w m
Hx l q n v r' "s x o _ r w n j t r w p 2 _ r w n Y' j k n r' j "x w j w m
G p r w p 2 O' n l q U y n w 286872yy47R4 4

d86f a 4Rr n' j ul l j k-d j "xw j w m v nl qj w l j u k n q j " x ~ x o
' l j u k u n u p q' n p q' q p q 3 " n w p' q l x-t R4 v k x x
' j w m d l q l x v y x' r' n' 2 Gm#I xy' V-xn2" xuf 7? 82y4
77<6<>2 Lnk4 86892 nrx@ 764767<5
s4 w l -xy 4688477<6<>4

d87f P4X4Mkw' u' 3Gmj nx' 2L4Mkw' u' 3Nn-w wmm'2P4R4
Mj -l j m I nl j 2S 4P4I l n-n' 3K' "nkj w2j w m S 4 I 4
Mj -l j 3] j u n x 2 i _ r w n j k' x-y "xw k' l x-t ' "x y y n-2
Y j y w' q P4 G p -d 4 X n' 2" x u f < 2 w x 4: 2 y 4 < ; 2 J n l 4 8 6 6 > 2
n x r @ 6 4 : 8 : 5 ' s j - 5 8 6 6 > 6 < : 3 ; < 4

d88f P4X4Mkw' u' 3Gmj nx' 2L4Mkw' u' 3Nn-w wmm'2P4R4
M4nm I nl j 2S 4P4I l n-n' 3K' "nkj w2j w m S 4I 4Mj -l j 3
] j u n x 2 i _ r w n j k' x-y "xw k' l x-t ' "x y y n-2 Y j y w' q P4
G p -d 4 X n' 2" x u f < 2 w x 4: 2 y y 4 < ; R A ? 2 8 6 6 > 4

d89f V4 Q4 Q- ' q o j q j j w m X4 Q- v j -2 i Y ~ n m' x w _ j " n ~
Gk' x-y "xw xo Hj v k x x 3 V x u n' " n - I x v y x' r' n' @ K n l "
x o Y r j w n Z - n j " v n w' x o S n l - n ~ n m H j v k x x 2 V x u v 4
V i j " 4 Z n l q w x u f K w p 2 " x u f : ? 2 w x 4 7 2 y y 4 : ; R 4 8 2 J n l 4
8 6 6 ? 2 n x r @ 6 4 7 6 > 6 5 6 9 < 6 8 ; ; 6 : 6 9 8 > 9 6 8 < 4

d8: f P4 X4 Mkw' j u' 3 G m j n x' 2 S 4 I 4 M j -l r j 3] j u n x 2 S 4 P 4
I j l n-n' 3K' "nkj w2 P4 R4 Mj -l r j m I nl j 2 L4 Mkw' j u' 3
Nn-wj wmm'2 j w m X4 I j u x 3 N j -x 2 i l x w' -x u k'
G Z X 3 L Z O X x o' -g l n -n j " v n w' x o l x-t ' " x y y n- j w m
r' " n n l " x w " q n r - v n l q j w l j u y n - o x - v j w l n 2 _ x x m Y l r 4
Z n l q w x u f " x u f : < 2 w x 4 7 R 9 2 y y 4 9 : ? R 9 x 6 2 J w 4 8 6 7 8 2 n x r @
7 6 4 7 6 6 = 5 ' 6 6 8 8 < 3 6 7 7 3 6 : 6 9 3 4

d8; f Y4 Gp j "xw" d 3Q- " -rw j w m I 4 S 4 R x n' l q n-2
i W-j u' j "r" n j w m z-j w r' j "r" n q p q y n - o x - v j w l n " q w
u j' n - l q - x v j " x p - j y q' j w j u' r' x o l j u n w m - u j x l r w j u'
- ' r w p q p q - n' x u - " x w y u j " n r v j p r w p j w m j ~ r l i j u m ~ - j u
w n' o x-t n j " j v x n m u r w p 2 G w j u f I q r v 4 G l' j 2 " x u f
= ? > 2 y y 4 7 6 9 R 7 6 > 2 U l " 4 8 6 7 9 2 n x r @ 7 6 4 7 6 7 < 5
s 4 l j 4 6 7 9 4 > 4 6 : > 4

d8<f K4H4I 4Yj w' x' n' j ul l k n l " x o G u t j u r w n j w m N x " _ j " n ~
Z - n j " v n w' " x w " q n Y' ~ l " - n j w m S x - y q x u p' x o
V i j ' j j L t k n - 2 Sj " n - 4 X n ' 2 " x u f 8 7 2 w x 4 8 2 y 4
n 8 6 7 = 6 9 < ; 2 L n k 4 8 6 7 > 2 n x r @ 7 6 4 7 ; ? 6 5 7 ? > 6 3 9 = 9 3 v - 3
8 6 7 = 3 6 9 < ; 4

d8=f J 4 R 4 Y 4 G p x' " r w 2 I 4 P 4 R 4 I x w " j w' r w 2 j w m G 4 K 4 B k 2
i n - v j u m p - j n j " r x w x o k x " q u j " n t j w m j " n t l j " " u '
o x - v r w p v n v k - j w n 2 P4 n - v 4 G w j u f I j u - r v 2 " x u f
? 7 2 w x 4 9 2 y y 4 = 6 9 R 4 6 = 2 S j - 4 8 6 6 > 2 n x r @ 7 6 4 7 6 6 = 5
' 7 6 ? = 9 3 6 6 = 3 9 ; 7 3 t 4

d8>f Y4Gt kj -t2G4M-y' j 2Z4G4Qgj w2Y4Y4B j v j -t2T 4H4I 4
Gw2j w m V4Vx nmj -2iY' w' qn' r' j w m l qj -j l " n - t j " r x w x o
v n n r - v n m w' r' o k n ~ k x j - n k' - ' r w p v t e' - n x o
w j " - j u ~ k k n ~ u j " n t j w m " j - l q j j' j w j n q n' r' n 2 P4
G m j w G l j n t _ x x m Y l r 2 " x u f 7 7 2 w x 4 8 2 y y 4 7 6 ? R 7 ; 2
J n l 4 8 6 7 : 2 n x r @ 6 4 7 6 6 = 5 ' 7 9 7 ? < 3 6 7 : 3 6 7 8 : 3 6 4

d8? f X4X x' 3Xnrw j 2X4S 4I j uns w2I 4Uu' n-3Vx' x2P4S 4
Gv ipx2j w m J 4R4Mj -l j 3Mkw' u' 2i GZX3LZOX j' j
yx "nw' rju "xxu o~ l xw' -xurwp qppq z-j u' " r w n j ~
l j " n p x - n i 2 L x x m l x w' - x u f = > 2 y y 4 8 9 6 R 8 9 = 2 G - p 4
8 6 7 = 2 n x r @ 6 4 7 6 7 < 5 s 4 x n l x w' 4 6 7 = 4 6 8 4 6 < ; 4

d96f Y4J 4 Yn' j 2 X4 V4 Lnul rj wx2 R4] 4 Hkj' 2 j w m S 4 X4
H-xw' n2 i Gyyul j "xw xo LZOX3GZX "x S x' l j "nu
m' l n' o r w l' o x ~ y - n m l " x w x o " x " j u y q n w x u l j w m
j " x w x m l x w' n w " j w m j w' r x t m j w' l j y j l r' 2 L x x m
I q n v 2 " x u f 7 ; 6 2 y y 4 : > ? R A ? 9 2 S j o ' 8 6 7 : 2 n x r @
7 6 4 7 6 7 < 5 s 4 x n l q n v 4 6 7 9 4 7 4 6 8 > 4

d97f Y4Yj wl qn' 3Yj n' 2 K4 Hj -kn-x2 Y4 Q4 Mj -l r j 3 j' " n u x 2 Q
Oj n' 2 j w m P4 I r - w n 2 i K t y n - v n w' j u - n' y x w' n x o
j p p u v n - j " n m l x - t - w m ~ v - u r 3 v y j l " u x j n i 2 Sj " n - 4
R n 2 " x u f 7 < 6 2 y y 4 9 8 = R 9 0 6 2 J n l 4 8 6 7 ; 2 n x r @ 6 4 7 6 7 < 5

- s4 j "un"867; 46>46784
- d98f M4I 4S 4Y4 nm] j' l x w l n u x ' 2 R4 N4 nm I j ~" j u q x 2 X4
Hj -kx' j 2 X4 nm I 4 nm R4 Qj u w x 2 j w m Z4 Y4 G u n ' 2
iK nl "" x o ° n j " q n - r w p x w v n l q j w l j u j w m
v x - y q x u p d j u y - x y n - " m ' l x - t u n m p - n w
y x u n " q ° u w n n l x 3 x v y x ' r ' n ' 2 V x u v n - x ' 2 " x u 4 9 6 2 w x 4
7286862 n x r @ 7 6 4 ; ? 6 5 6 7 6 : 3 7 : 8 > 4 6 : ? 7 ? 4
- d99f K4S 4Ln-wj w m ' 2 G S 4 G - x ' x 2 P 4 L 4 S j w x 2 P 4 G 4 I x " j ' 2
j w m X 4 R 4 X n r ' 2 i L - w l " i x w j u ° n m l x - t 3 y x u v n ~
l x v y x ' r ' n ' . I V I / k ° - n j l " r ' n n t " - ' i x w - ' r w p ' - k n - r w
j w m u p w w o - x v l x - t j ' l x - y u w p j p n w " 2 I x v y x ' 4
V j - " H K w p 2 " x u 4 < = 2 y y 4 9 = 7 R 9 > 6 2 J n l 4 8 6 7 : 2 n x r @
7 6 4 6 7 < 5 4 x v y x ' r ' n ' k 4 6 7 : 4 6 = 4 6 8 > 4
- d9: f R4 a r2J 4 W r w 2 a 4 G w 2 j w m M 4 _ j w p 2 i X n ' r ' " j w l n x o
T j " - j u H j v k x x L i k n ~ " x S d - x x - p j w ' v ' 2 j w m
L j l " x ~ " q j " S j ° G n l " Y - l q X n ' r ' " j w l n 2
H x X n ' x - I n ' 2 " x u 4 > 2 w x 4 : 2 y y 4 < ; 6 7 R 4 6 ? 2 8 6 7 9 4
- d9: f V4] u j l q x ' 2 G 4 Q i v y i x " r 2 S 4 Q x - w j - x ' 2 j w m M 4
R ° k n - j " x ' 2 i J n " n u x y v n w ' j w m n " j u - j " i x w x o j u n - w j " r ' n
y - x l n ' n ' α ~ ' " n - u ° j " i x w j w m m x n x - t ° j " i x w x o l x - t
k j - t ' j w m w j " - j u l x - t " x y y n ~ 2 K - 4 L x x m X n ' 4
Z n l q w x t 2 " x u 4 8 8 ; 2 w x 4 ; R 4 2 y y 4 < ; 9 R 4 < 9 2 P - u 4 8 6 6 = 2
n x r @ 7 6 4 6 6 = 5 ' 6 6 8 7 = 3 6 6 < 3 6 : < 7 3 4
- d9<f S 4 I 4 I - j " n - x 2 i S - ' " ° j w m S x u n f Z j r w " r w _ r w n ' @ G
X n " m ° 2 H h " n - j p n ' 2 " x u 4 < 2 w x 4 8 2 y 4 : 7 2 P - w 4 8 6 8 6 2 n x r @
7 6 4 9 9 ? 6 5 k n " n - j p n ' < 6 8 6 6 : 7 4
- d9=f G T] O G 2 i X K Y U R [U 3 X J I T * 7 8 2 J K 8 J K
I G T K O X U J K 8 6 6 7 4 G y - x " j x X n p - u j v n w ' x Z l w l x
' x k - n y j m - n ' v d - x k x u p i l x ' y j - j j u v n w " x ' 2
G p w l j T j l 4] p r u w l j Y j w r " - j . J 4 U 4 4
7 6 5 6 7 5 8 6 6 7 / 2 y 4 7 2 8 6 6 7 4



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