

Aluminium Tertiary Industry Waste And Ashes Samples For Development Of Zeolitic Material Synthesis



Kpyt-p H3M yr1 "z6/ IRl .tl J 3Ztwl 6 lyo Hwl LwKty T l s x z" o 78 ID

6Ry-t .z op Wp- t1-Lyp'r .tnl -pU" mpl "p-1FWUμJ ULU4ZWZ z W" w IZWI "l atw
7Lyot'zyx py.l wZntpymp-Kp-l .x py. lMn" wá zqZntpympIHw° lyo"tl] yto'p-t á176: 66 Hw° lyo"tl lLrá~3
8N"ppy [pnsyz wá r á N"z ~lMn" wá zqZntpympIHw° lyo"tl] yto'p-t á176: 66 Hw° lyo"tl lLrá~3

Hi Z [J [Ab l-p-rpypl .po ty w'rplx z"y.-sl op nppy "pnzrytápo l--" -l tyl mpp-z" "np-zq"l μ x l .p"tl w q" .sp-áy .sp-t-
zql o-z" npy-3 p-áy .sp-t-zqápz w p .s"z" rs μ l-p- "pnánwyr zq .μ z ot p'py. l-s-z" "np--nzl wnz z x l-s lyo -"rl "nly p
μ l-p-l-s. lyo tyo"- "tl w'wx ty" x μ l-p μ l-p-ol w l .po3 p x z w" l .tz zqZtV ,4HwV 8 q" ápz w p 9H q" x l .tzy μ l-lns tpo po
ná .sp loot-tzy zql w'x ty" x μ l-p q'z x .p"tl "á tyo"- "á l-l'wx ty" x -z" "np3J z l wnz z x l-s lyo -"rl "nly p μ l-p-l-s μ p'p
"-po l-l-z" "np z q n z .s -twál lyo l'wx tyl3 p-áy .sp-tápo x l .p"tl w μ p'p nsl "ln-p'tápo -"tyr c Zl á ~z μ op" ot "ln-tzy
-c YK. l-nlytyr pwpn "zy x tn'z-nz-á -ZLT. lyo nly .tzy p'nslyrp nly -lnt á -J LJ .3 p lyl w-t- zq .sp ~z~p' .tp- zq .sp
~z"o" n- opx zy- "l .p- .sl . .sp ná2- "z"o" n- nly np -"po .z ~z"o" np ápz w p H3 p " .twál .tzy zq-áy .sp-tápo ápz w p-l-
lo-z" npy. q" n l ox t' x "px z ol w'q'z x l' "pz"-z w' .tzy μ l-nzyo" n po q w μ ty r .sp nzy n p~ z qtx ~wpx py. l .tzy z q" .twál .tzy
z q μ l-p x l .p"tl w l-l n z x ~zy py. z q .sp n t" n" w" pnzyz x á ty .sp μ l-p μ l-p- "pn-z" 3

Rpá μ z "o-Azyz 2zyo py .tzy l w'wx ty" x -z" "npBnz l wnz z x l-s B-"rl "nly p μ l-p-l-s Báp z w p HBsl ál "oz"- μ l-p Bl o-z" ~tzy

1. INTRODUCTION

Uz μ l ol á-l n z x x p"ntl w lyo tyo"- "tl w ln-t' t-tp-
rpypl .p pyz "x z"- lx z" y. z q -z w o μ l-p x l .p"tl w l-
má2- "z"o" n-3 T z- z q .sp lr "z tyo"- "tl w μ l-p- l" p
"y .pl .po lyo "yop" .twápo l .sp' p q' p .sp á l" p pt-sp"
ot-z-po ná wyo w yr z" m "y tyr3 Z" ns "y"- l tyl mpp
~l n-tp- l" p .sp q-2" z μ ty r ~z mpx -nl" -tyr -tyr t nly .
yprl .t'p tx -l n- z y pyot'zyx py .l l' "l .tn pnz-á-px l lyo
s" x l y spl w s 3

p nzy n p~ z q" .twál .tzy z q μ l-p x l .p"tl w l-l
n z x ~zy py. z q .sp n t" n" w" pnzyz x á t-l ~z .py .tl w w'yl .t'p
.z .sp ot-z-l w z q .sp-p "p-to" p- ty wyo w-t-p-3 b l-p
x l .p"tl w nly np .l y-q" x po ty .z ol w'p z l oopo x l .p"tl w p"
x zot nly ty ná .pl .x py .- "ns l-ns px tnl w .sp" x l w l yo
s áo "z .sp" x l w f6h3

p l'wx ty" x "pnánwyr nzy-t- z q -pnzyol "á lyo
.p"tl "á l'wx ty" x tyo"- "á3 p -pnzyol "á tyo"- "á "pnz o'p-
x p-l w ná x p w ty r t ty "z .l "á w ty -q' p w o ná n z x n' -tnp z tw l
"-tyr -z ot' x ns w' top l-l "o3 t-~z np- rpypl .p-yp μ
-w r l w p- "t ns ty l'wx ty" x μ t s lx z" y .lnz" .75* z q .z .lw
oz w x p3 p .p"tl "á tyo"- "á "p- ot p'py. ~z np-p- z
"pnz o'p" .sp "p-to" l w l'wx ty" x ~p-py. ty .sp l'wx ty" x
μ l-p z q .sp -pnzyol "á tyo"- "á f729h3

p μ l-p- q'z x .p"tl "á l'wx ty" x l" p l "l .sp"
n z x ~w" x t' . "p nzy .l ty ty r q'pp x p-l w l x p-l w z" top-l l yo
-l w-3 p ot-z-l w z q .st- μ l-p μ t s z" .ly á . "pl .x py. nly
n slyrp .sp "l w á z q r" z" yo μ l .p" lyo -"q np μ l .p" l
x l ty w o" p .z str s w p w z ql x x z ytl f9h3 p'p q' p l p z .-
sl op nppy x l op .z " .twá p l'wx ty t' x .p"tl "á tyo"- "á μ l-p
l-l y l'wx ty" x -z" "np ty n z- p pn t'p ~z"o" n-tzy f: 2-h3

p "p z q .sp Hw nzy .l ty ty r μ l-p l-l'wx ty" x -z" "np
ty .sp-áy .sp-t- z q ápz w p- t ly l w p'yl .t'p .z ty l op' "l .p
ot-z-l w e p z w p- sl op o'p-l .t'p l ~w l .tzy- tyn w'oty r

pyot'zyx py.l w tyo"- "tl w n z x x p"ntl w l r "tn" w" l w l yo
ntz x potnl w l yo l-z l" p nzy-top" po l-ol w'p z l oopo x l .p"tl w
a l "tz"- pnz w r tnl w l .p"tl w l r "z μ l-p l yo x l y" q n" "tyr
μ l-p-s l op nppy "-po l-l -l .tyr x l .p"tl w ty -áy .sp-tátyr
ápz w p f? l(6h3

Hx zyr .sp ol "tz"- .á-p- z q ápz w p l ápz w p w p H2 á-p
t- zyp z q .sp x z- tx ~z .ly. x z w p n" w" -tp o-p-l n p n l -p
~p-py .- str s lo-z ~tzy nly -lnt á lyo nly pl-tw p'nslyrp
-z ot' x tzy μ t s z .sp" nly .tzy-l p-~pntl wá nly wá" x 3
M" .sp" x z" p l ápz w p H t- .sp x z- n z x x p"ntl wápo ty .sp
μ z "w l x l ty wá" -po l-ly loot-t'p ty w" yo "á op-p' rpy .-f65 l
66h3

Ry rpypl w n z x x p"ntl w-z ot' x l'wx tyl .p t- .sp x z-
n z x x z y wá ns px tnl w'pl rpy. "-po .z nzy .z w s p Zt4Hw l .tz
o" p .z .sp w μ l'wx ty" x nzy .py. ty .sp μ l-p- "po q" .sp
-áy .sp-t-z q ápz w p H3 O μ p o'p μ l-p q'z x l yz .sp" tyo"- "á
nly np "-po l-z" "np z ql w'x ty" x lyo -z .st-~z npo" p μ ty w
pys l y n p .sp pyot'zyx py.l w mpy p . má " .twátyr o" l w μ l-p-
f6726: h3

Ry .sp ~p-py. -"oál μ p ty o-p-tr l .p .sp "-p- z q
Hw nzy .l ty ty r μ l-p l-ly l'wx tyl -z" "np lyo .μ z .á-p- z q
l-s p-l-z" "np z q-t w l lyo l'wx tyl 3V y p l-s -l x ~w t-nz l w
nz z x l-s l μ s tns t- rpypl .po o" "tyr .sp m" "y tyr z q n z l w
~" w p'tápo ty n z t'p" lyo t- ot-z-po ty wyo w z" t-
"l y ~z" .po .z .sp-p w yr ~zyo-μ t s yz q' "sp" -l r p f6; h3
p z .sp" μ l-p l-s t- rpypl .po ty -"rl "l yo l w z s z w
tyo"- "á3 l "l á t w l yo Lrá- l'p .sp μ z "w t t w' r p- -"rl "nly p
~z"o" np-3 Mz x -"rl "nly p ~z np-tyr l n l r l-p lyo -"l μ

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l“pnl wtypo q“ ~zµp“ rpypl“ tzy3H p“ .st-~lrlp l-”rl“ nlyp nrl -p l-s t-~”zo” npolyo t-”-l wá l nlyozypoty .sp-zt3 Z”rl“ nlyp nrl -p l-s sl-~trty nly. lx z“~sz”-~twnl ty t- nzx ~z-t zylµs tns nly np”-po ty ápzwp -áy.s-p-t-f6=16?h3 epzwál .tzy zql wáx tyz-twnl .p “p-to” p- t-ty ”pynpo ná l µtop “lyrp zq -l“lx p-p“3 b tsty .st- nzy.p“l .sp zmpn-tºp zq .st- -” oá µl- z~tx tätyr .sp pº~p“tx py.lw nzyot-tzy- zq ápzwp H -áy.s-p-t- ”-tyr Hwá l-p l- lwp“yl .tºp .z nzx x p“nrl w-zot“x l wáx tyl .p llyo .µz l-s-p -lx ~wp-l-x ltywá -z” “np zq-twnl 3 p ~p“q“x l ynp zq .sp ~p-l “po ápzwp-ty .sp “px zºl wzqj o70 qz x µl .p“ µl-l wz tyºp-tr l .po3

2. MATERIALS AND METHODS

73 Tl.p“dw

Hwns px tnl w”-po q“ pº~p“tx py.lw-” otp- µp“p zq lyl wá .tnl wr“lop3 J zl w n z x l-s -lx ~wp -J I H µl- nzwon-po qz x Q”rp Sl np“ol n z l wá “po ~zµp“ ~wly .lw n l .po ty Zly .l J l .l “tyl Z l .p l l “l á t w Z” r l “nlyp µ l -p l -s -Zb H µ l -o z y l .po ná J z -l y Z H H l “l á t w p “p-to” p z q l wá x ty” x .p“ .d “á tyo”-“á . . µ l -~zºtopo ná .sp n z x -lyá S l -l -l Y p n á n t y r w n l .po ty Z z W” w Z l .p l I “l á t w H “p~p-py.l.tºp -lx ~wp µ l -x tºpo lyo szx z r p y t á p o ná -” m p -tºp ’ ’ l “p“tyr3 Z z o t” x s á o “zºtop -@* . l y o -z o t” x l w á x t y l .p -655* . z m l t y p o q z x Z t r x l 2 H w “t n s W á 3 S .o 3 -H” -“l wá . µ p “p” -po ty .sp ~p-l “l .tzy z q á p z w p -áy .s-p-t-3

73 epzw p -áy.s-p-t- ”-tyr n z x x p“n l w -z o t” x l w á x t y l .p

Zá y .s-p-t- z q á p z w p µ l - pºp n” .po ná l .µ z 2 -p -~z n p -3 M -wá l 65 r z q l -s -l x ~wp -J I H z “ Z b H µ l -x tºpo µ t s U I V O l . 6 6 3 -µ . * . “ l . t z 3 p x tº . ” p µ l -s p l .p o l . : 55 J q “ 6 s 3 H p “ n z z w t y r l . “ z z x . p x ~p l . ” p l n z x x p “ n l w -z o t” x l w á x t y l .p µ l -l o o p o . z . s p r “ t y o p o x tº . ” p . z n z y . “ z w . s p x z w “ l . t z -Z t V 7 4 H w V 8 D 6 . l y o x tºpo µ t s 655 x S o p t z y t á p o µ l . p “ 3 p x tº . ” p µ l -s p y -t “ p o l . “ z z x . p x ~p l . ” p q “ 6 ; s l y o s p l .p o l . 655 J q “ = s 3 H p “ n z z w p o l . “ z z x . p x ~p l . ” p l . s p -~p y -t z y µ l - w p “ p o l y o . s p -z w o µ l - “ p -p l . p o wá µ l -s p o µ t s 6 S z q o p t z y t á p o µ l . p “ l y o o “ t p o l . 65 : J q “ 6 ; s f 6 @ 3 p á p z w p - á y . s -p -t á p o q z x J I H l y o Z b H µ p “ p y l x p o l - e J I H l y o e Z b H l “ p -p n -tºp w á 3

73 epzw p -áy.s-p-t- ”-tyr “p-to” p z q l w á x ty” x .p“ .d “á tyo”-“á

M -tzy . “ p l . x p y . µ l -~p “ q “ x p o ná ~w n t y r 65 r z q l -s -l x ~wp -p t -s p “ J I H z “ Z b H µ t s l y o U I V O 3 p “ l . t z -l -s 0 . A U I V O µ l - ° p o l . 6 6 3 -µ . * . 3 p µ l -l o o p o . z l o u - . s p x z w “ l . t z z q Z t V 7 4 H w V 8 . z 6 q “ á p z w p 9 H q “ x l . t z y 3 p x tº . ” p µ l -s p l .p o l . : 55 J q “ 6 s 3 p q “ -p o -l x ~wp µ l -l w á µ p o . z n z w . z l x n t p y . p x ~p l . ” p l y o r “ z ” y o p o t y . z l y p ~z µ o p “ ” -t y r l x z “ l “ l y o ~p -w p 3 p y l o p t z y t á p o µ l . p “ µ l -l o o p o l l y o . s p x tº . ” p µ l -t “ p o l . “ z z x . p x ~p l . ” p q “ 6 ; s 3 p “ p -w t y r -w “ á q “ x p o µ l - ” m p n -p o . z s á o “ z . s p “ x l w n “ á -l w á l . t z y l . 655 J q “ = s 3 H p “ n z z w p o l . “ z z x . p x ~p l . ” p l . s p -~p y -t z y µ l - w p “ p o l y o . s p -z w o µ l - “ p -p l . p o wá µ l -s p o µ t s 6 S z q o p t z y t á p o µ l . p “ l y o o “ t p o l . 65 : J q “ 6 ; s 3 p á p z w p - á y . s -p -t á p o q z x J I H l y o Z b H l y o µ p “ p

ylx po l- eJ I H2 lyo eZb H2 l “p~pn-tºp wá3 p ’ ”ly .t-tp- zq “pl rpy .- ”-po ty .sp -áy .s-p-t- l “p -szµy ty [lmp 63

[lmp 6 Lº ~p“tx py.lw z y o t -t z y -z q á p z w p - á y . s -p -t -

Tl.p“dw	Hs Zlx ~wp	
	Zb H	J I H
UIVO	: @ 3 r	7: 3 r
-Hs 0	; @ 3 r	8: 3 r
O7V	; @ x S	8: 5 x S

73 J sl “ln-p“tál .tzy z q l -s -l x ~wp- l y o “p-to” l w l w á x ty” x

p x t y p “ l w r t n l w n z x ~z -t z y -µ p “ p o p “ x t y p o ná c Z l á o t “ l n -t z y l y l wá -p -c Y K . µ t s l y l ” . z x l . p o Y t r l v ” T t y t pº 7 o t “ l n -z x p -p “ µ t s J ” l y z o p ” -t y r J z R “ l o d . t z y l . 95 v a l y o 75 x H z o p “ . s p “ l y r p -7 . z q : µ ? 5 µ t s l -n l y . t x p z q 53 4 x t y 3 p n s p x t n l w n z x ~z -t z y µ l -o p “ x t y p o ná c Z l á ” z “ p -n p y n p -c Y M t y Y t r l v ” Y R 2 8 5 5 5 p ’ ” t -x p y . 3 p “ x l w l y l wá -t -µ l -~p “ q “ x p o ná . s p “ x z r “ l o t x p “ á z y . s p T p w “ 2 l z w o z p ’ ” t -x p y . x z o p w [N H 4 Z K [H ? : 61 µ t s s p l . t y r z q 65 J 4 x t y 3 L l n s -l x ~wp -763=@x r . µ l -s p l .p o q z x 7 : . z 6755 z J l . l s p l . t y r “ l . p z q : z J f k t y “ 61 ” y o p “ l y t “ z r p y ” -s - : 5 x S f k t y “ 6 . 3 p -n l y y t y r p y n -z y x t n “ z r “ l -s - µ p “ p ~p “ q “ x p o ” -t y r l O t l n s t [T 28555 x t n “ z -n z ~p 3 p ~l “ . t n w p -t á p z q . s p x l . p “ d w µ l - x p l - ” p o ” -t y r l w -p “ n l -p o -l “ . t n w p -t á p l y l wá -p “ l y l x p wá l T l w p “ y T Z Z T l -p “ -t á p “ 7555 a p “ 3 : 3 93 J l . t z y pº n s l y r p n l ~l n t -á -J L J . µ l - o p “ x t y p o ná l ~pº t z ” -wá o p -n “ t n p o ~z n p o ” p f 6 @ 3

p n s p x t n l w n z x ~z -t z y z q n z l w n z x x l -s l y o -” r l “ n l y p µ l -p l -s s l -n p p y “ p -z “ . p o t y ~pº t z ” -l ~p “ l y o . s p o l . l l “ p - ” x x l “ t á p o t y [l m p 7 f 7 5 2 7 7 h 3 p -l “ . t n w p -t á p o t - “ t n ” . t z y -z q x l . p “ d w l “ p r tº p y t y [l m p 83

[lmp 7 J s p x t n l w n z x ~z -t z y -µ . * . z q l -s -t x ~wp-

J z x ~zyp y .-	Hs Zlx ~wp	
	J I H	Zb H
ZtV7	9@	?63
HwV8	7=3	=3@
M7V8	653@	736
R7V	935	735
[tV7	63@	53 =
Ul7V	63@	53 ;
T r V	635	63 ;
V . s p “ -	53=5	63 =

[lmp 8 W “ . t n w p -t á p o t - “ t n ” . t z y -z q . s p l -s -l x ~wp-

Hs Zlx ~wp	K65	K.5	K@	Kf87h
J I H	- x .	- x .	- x .	- x .
Zb H	: 538?	6=3: 3:	99=3=99	? ; 3@ 9
	673=	; 73 ?	75? 39	7 ; 3: 9

73 Ho-z“~tzy H~vnl .tzy

epzwp-áy.sp-tápo μl-”-po q“ lo-z“~tzy -”otp-3 L’ twnít”x lo-z“~tzy p“p“tx py. μl- ~p“q“x po ”-tyr ol“tz”- nzynpy. “l.tzy- zq nlox t”x - : 5 .z 69; 5 x r S². -zŵ.tzy 3Hx t“.”p zq 53: r zqāpz wtnx l.p“dl we J I H2 z“e Zb H2 . μts 7: x S zqx p.lwtzy -zŵ.tzy zqol“tz”- tyt.d.wnzynpy. “l.tzy- μl- -slvpy l. 675 “~x q“ 79 s l. 7: J 3 p nzwpn.po -lx ~wp- μp“p .spy w“l.p lyo .sp nzynpy. “l.tzy ty .sp w“l.p -zŵ.tzy μl- lylwápo ”-tyr tyo“n.tpá n” ~wp- ~w-x l z~tnl wpx t-tzy ~pn-“zx p“á -Z-pn-“z HYJ VZl Z-pn-“z Hyl w.tnl wRy-“”x py.-l Rwp“pl Np“x lyá. 3Hwp“p“tx py.-μp“p ~p“q“x po ty o” ~vnl .p3 p lo-z“~tzy nl-lnt.á zq .sp lo-z“npy. μl- nl w“w.po ”-tyr L’ 3-6. f78179hA

$$q_e = \frac{V(C_0 - C_e)}{M} \quad -6.$$

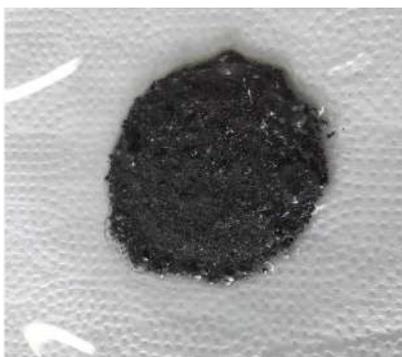
b sp“p ‘p t .sp lx z”y. zqx p.lwlo-z“mpo ~p“ ”yt x l-zqlo-z“npy. l.p’ twnít”x -x r r². 1J_z lyo J_p l“p .sp tyt.d.wyo p’ twnít”x nzynpy. “l.tzy-l“p~pn.tpá -x r S². B a .sp“zŵx pzq.sp lo-z“nl .p-zŵ.tzy loopo -S. lyo T .sp lx z”y. zq.sp lo-z“npy. ”-po -r. 3

pol.l zq.sp t-z.sp“x lo-z“~tzy p’ twnít”x μp“p po ”-tyr zzywyp“l p’ l.tzy-zqSl yrx ”t“lyo Mp”yovns x zopw f7: 17; h3 p op“p“x tyl.tzy nzp ntpy. -Yloú. μl- ”-po .z op“p“x typ .sp np-2 tyr t-z.sp“x .z .sp p“p“tx py.lwol.l3Ry loot.tzy l.sp J st2’ ”l“p-n7. .p- μl- px ~wápol .sp wμp- olw“p- μp“p ”-po .z olwol.p .sp l~vnl ntwá zqt-z.sp“x -p-pof7=h3

3. RESULTS AND DISCUSSION

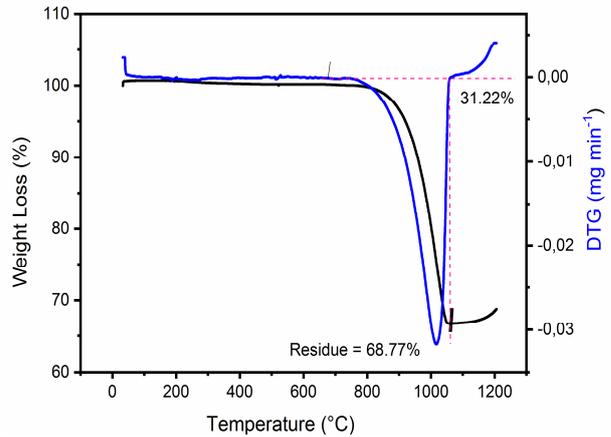
83 J sl“ln-p“tál .tzy-zq“p-to”lwlw“x ty”x μl-p

p“p’ t“po Hw“lx z”y. q“ .sp ~p-l“tzy zqāpz wp μl-x ltyw ~z“otopo má Hwzyl tytyr μl-p3 pμl-pqzx lwx ty”x .p“dl“á tyo”-“á nzy-t-- zql mlwv ~zμop“ -Mr”p 6. lyo l op.ltpo nsl“ln-p“tál .tzy μl- op-n“tupo pwpμsp“p f7?h3l “tp á.l.sp x lty nspx tnl wzx ~z-tzy μl- HwV₈ 7=3 μ.3 1J w6=3 μ.3 1U1₇V 6; 3 μ.3 1ZlV₇ 83=? μ.3 lyo TrV1RV₇1Mp₇V₈ 73=μ.3 3 p x ltyw nzl“p -l“twp -táp -K₆. μl- ó9:5 x 3 p .z.lwnzy.py. zq lwx ty”x t- ot-“tni .po ty ot p“py. n“á-lwyp ~sl-p-l ylx p wá n”yo”x -HwV₈B1 -áwt.p -RJ w1 -typw -TrHwV₈B1 slwp -UlJ w lyo dálwp -7MpV 3V₇. 3 p strs J wlyo Ul nzy.py. l“p l “tni .lmp .z .sp px ~wá zq strs lx z”y.-zq-lw-x ltyw UlJ wlyo RJ w ty .sp x pwtyr ~znp-z rp.l strsp“lwx ty”x “pnz“p“á f8h3



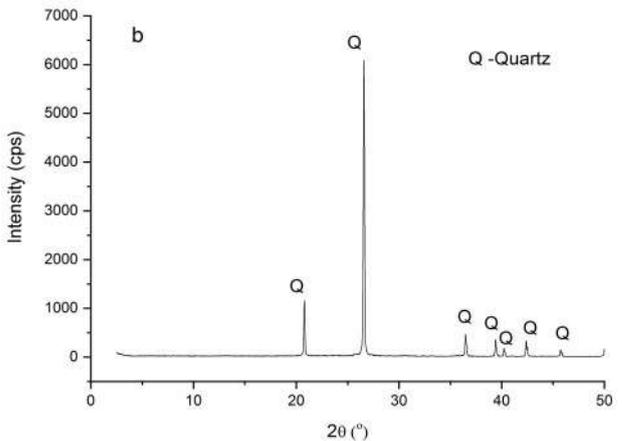
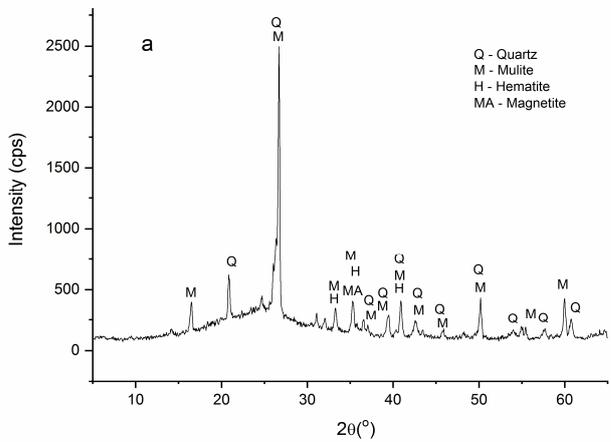
Mr 363T ln“z-nz-tnl ~pl“lynpzqlw“x ty”x μl-p-lx ~wp

p .sp“x lw -lntwtp- lyo opnzx ~z-tzy .px ~p“l.”p-zq μp“p ty“p-tl.po ”yop“ ly typ“. l.x z~sp“p lyo .sp t“ [NH4K[N .sp“x zr“lx -μp“p rt“py ty Mr”p 73Hy zywá ~plv μl-zm“p“opo l. 6595 J lyo l w-zqó86* x l-μl-op.pn.po3 t-w-zm”-ty l-tyrwp-p-o”p .z ns w“top nzx ~z”yo- opnzx ~z-tzy ty l zyz“tol2 .t“p ~znp-3 plx z”y. zqó ; @ “p-to”pl .sp pyo zq.sp p“p“tx py. tyotnl.p- .sl. .sp -lx ~wp sl- strs tyz“rlytn nzx ~z”yo-nzy.py. μts l .sp“x lw-lntwá3

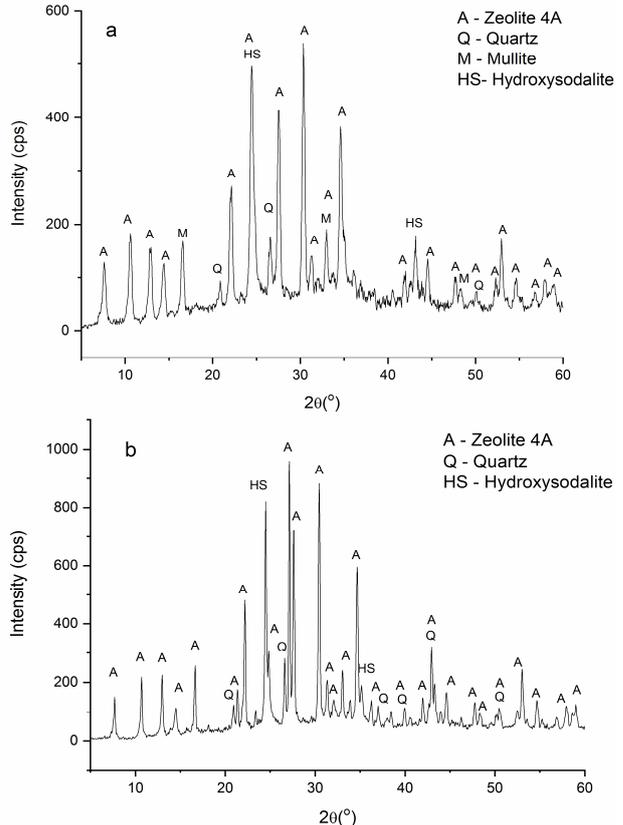
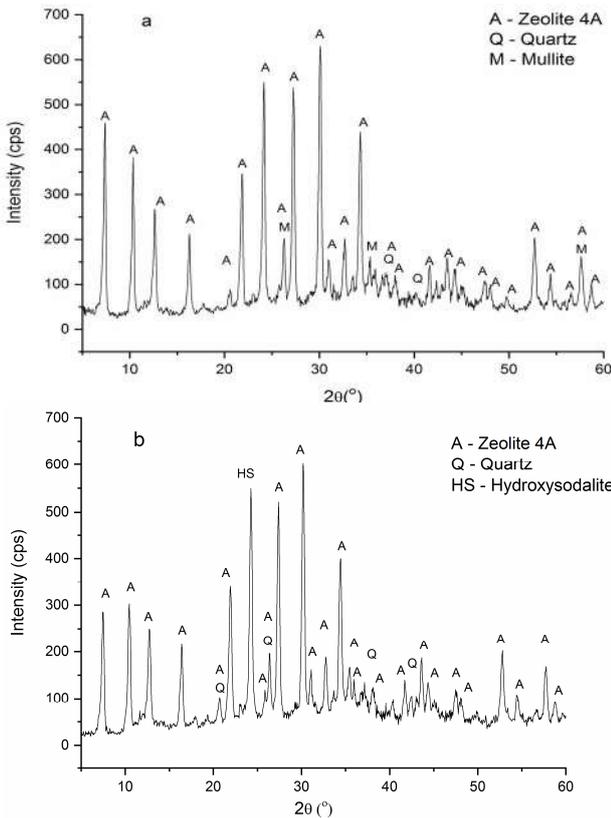


Mr 373 p“x zr“l“otx p“tnl ylwá-t-n”“op-ty U₇ l.x z~s p“p q“

83 T typ“lwrtnl wzx ~z-tzy zq.sp l-s -lx ~wp-



Mr 383c Zl“á ot “ln-zr“lx -zqA-l. nzlwnz zx l-s-B-m -”rl“nlypμl-pl-s



Mr3 93 c Zl á ot "ln-zr"lx - zq l-s 2nl-po äpzwp- qz x lwx tyt" x µl-p-l. eJ I H2 B-m e Zb H2

Mr3 : 3 c Zl á ot "ln-zr"lx - zq l-s 2nl-po äpzwp- qz x -zot" x lwx tyl-p-l. eJ I HB-m e Zb H

px typ"lwrá "p" wzqj I Ht-ot~wápo ty Mr" "p 8l l tyotnl-tyr .sp ~p-pymp zq " "l" .ál x "w"pl spx l-t-pl x lrypt-pllyo slw µts lx z"~sz"-nzy-py.3Vy .sp z-sp" slyol-spc YK -l "p"y zqZb H-lx ~wp-Mr" "p 8m ~p-py-zyw ~plv-"pw"t"p .z n"á-lwtyp -t"nl l tyotnl-tyr .sl .sp m" ytyr .px ~p"l . "p zq .sp nrl-p l . .sp -"rl" x twµl-lnz"p?55 J 3

lyo sáo"z"á-zol wp µpp q" yo l-x tyz" ~sl-p-3X"l" .á lyo x "w"p t-l "tn" .po .z .sp "px l tytyr nzy-py .z q-sp-p nzx ~z"yo-ty .sp l-s -lx ~wp-lyo lwx tyt" x µl-p p"py l p" q" -tzy l lyo sáo"z"á-zol wp t- q" x po npl" -p t- .sp" x zoáylx tnl wá x z"p-lmp .sly äpzwp Hf7(á3

px p-szo q" zml tytyr Ul 2H äpzwp µl-z~tx tápo ~tyr á l-s l- "lµ x l .p"dl wlyo nzx x p"ntl w-zot" x lwx tyl-p3 p q" -tzy x p-szo µl-l ~wpo .z qntw"l .p opnrx ~z-ttzy zqZt lyo H2µts n"á-lwtyp ~sl-p-lyo q" x -z"wp lwx tyl-p- lyo -t"nl .p-3 Zzot" x lwx tyl-p µl-loopo .z nzy . "zws p Zt4Hw z w" "l .tz zq63 f6(á3

83B T z"~szwrtlwlyl wá-t- zq .sp l-s -lx ~wp- lyo -áy-sp-tápo äpzwp-

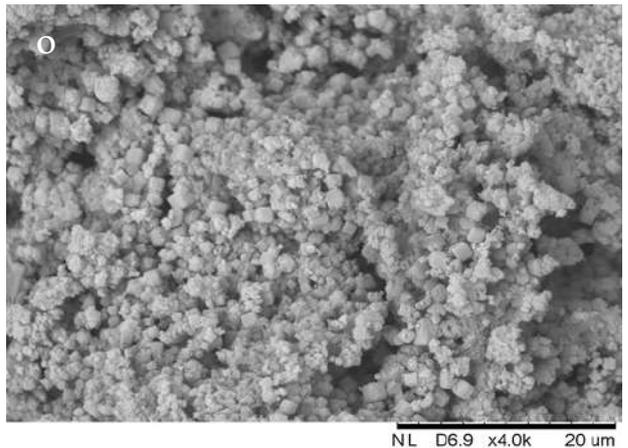
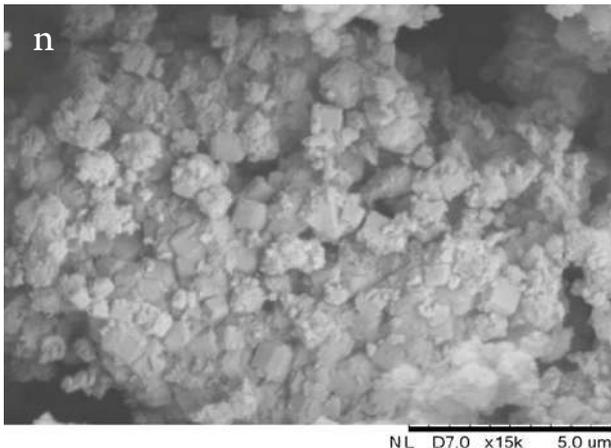
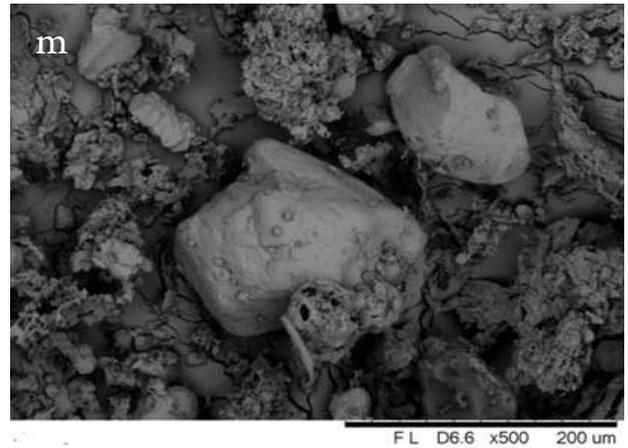
p x z"~szwrt p- zqj I H lyo Zb H l"p -szµy ty Mr" "p ; l lyo Mr" "p ; ml"p ~pn-t"pá3 ZLT tx lrp-zqnx .s -lx ~wp-szµ sp-p"zrpyz" -x l .p"dl wµts t" "pr" w" -sl-p-3 p ~sp"tnl w-s-l-p zqnl wnz zx l-s -l" .tnp--Mr" "p ; l . t- .á-tnl w zq nzlwl-sp- lyo nly np l "tn" .po .z .sp t" lx z"~sz" - nzl-tyr q" x po npl" -p zq "pw"t"pá l m" ~nzz wtyr l p" nzx m"-tzy3

t-x p-szo µl-lol~po q" .sp" -p zql wxy" x µl-p-l-ly lwp"yl .t"p lwx ty" x -z" "np .z .sp nzx x p"ntl w" "pl rpy-3 p "p-to" p µl-loopo µts l-s -lx ~wp lyo Ul VO ty .sp q" -tzy -p~ nzy-top"tyr .sl . .sp x typ"lwrá zq ~"poz x tyly .w nzy-t-po zqn"á-lwtyp ~sl-p-zql wxy" x 3 " -l l x pwtyr -p~ t- ypn p-l"á -z .sl . .sp "p-to" l wxy" x ot-zwp-lyo "pl n-µts .sp-t"nz y ~p-py .ty .sp l-s-p-z q" x .sp -zot" x lwx tyz -t"nl .p -"q ntpy .z q" x Ul 2H äpzwp3 p q" -tzy .px ~p"l . "p lyo .tx pl ~wpo zy .sp äpzw"tál .tzy ~"zn p-µ p"z z~tx tápo ty l ~"p"tz" --" oá f7517?h3

P nly np-ppy ty ZLT tx lrp zqZb H-Mr" "p ; m .sl . .sp -lx ~wp t- "tns ty lyr" w"2-sl-po -l" .tnp-l µstns l"p ~"znl má -t"nl zyp-3 p "z" rsy p-t-l-znl .po µts .sp "pwp-p zqz" rlytnx l p" o" "tyr .sp nrl-p m" ytyr ~"zn p- q" .sp rpy p"l .tzy zqpy p"rá ty .sp -"rl" l w zsz wtyo" -"á3 By loot-tzy l l µ top -l" .tnp -táp "lyr p nly np zmp"opo - : 2 55 x .3 V .sp" Zb H -lx ~wp- szµ po -tx tw" x z"~szwrt p-f85186h3

M" .sp" x z"plc YK µl-" -po .z topy .tá p .sp n"á-lwtyp ~sl-p-zq-sp -áy-sp-tápo äpzwp- -tyr "p-to" l w lwx ty" x µl-p-Mr" "p9.3 pot "ln-zr"lx -zq~zo" n--áy-sp-tápo qz x l-s -lx ~wp-lyo -zot" x lwx tyl-pl"pl wz ~p-py .po q" nzx -l"t-zy-Mr" "p : .3

p x z"~szwrá zq .sp -áy-sp-tn eJ I H2 lyo e Zb H2 äpzwp- l"p ~p-py .po ty Mr" "p ; n lyo ; ol "p~pn-t"pá3 p .á-tnl w" np -sl-po n"á-lw zqá p w p H-t-zmp"opo ty loot-tzy .z lx z"~sz" -z z wtyr x l .p"dl wqz x "lµ x l .p"dl w ty äpzw"tn x l .p"dl w p äpzwp n"á-lw ~"pnt-t-l .p zy .sp l-s -l" .tnp- zq nzl wlyo zq -"rl" nly p µl-p o" "tyr l w l wty p . "pl .x py .3 V .sp" n"á-lw zmp"opo µts yz . op ypo x z"~szwrá t- "pw" .po ~"znl má .z sáo"z"á-zol wp ~sl-p3



Mr 3; 3T tn'zr'l~s-zq-l. nzlwnz zx l-s l-m ~rl'nlypμl-pl-s B-n e J I H2 B-o. e Zb H2

83 J l·tzy p°nsl yrp nl~lnt·á z qāpz w tnx l·p°tl w

[lmp 9 -szμ l·sp nsl'ln·p°tāl·tzy zq·sp ~"zo"n-ty ·p'x -zqnl·tzy p°nsl yrp nl~lnt·á -J LJ . lyo ly p-tx l·p zq āpz w p nzy·py· ty ·sp -áy·sp-tāpo x l·p°tl w3 p J LJ μl- "po·z p-tx l·p-px t2 "ly·t·l·tōp ol·l zq·sp āpz w p nzy·py· ty ·sp -áy·sp-tāpo x l·p°tl w ná nzx ~l"tyr ·sp J LJ ol'w p zml typo μts ~"p nzx x p°ntl wāpz w p H-93 : x p' r3. 3 t-p-tx l·p nzy-top~·sl· J LJ ol'w p-φ "x tyz" ~sl-p-l "p ypr w t m p f87h3

[lmp 9 J l·tzy p°nsl yrp nl~lnt·á lyo ~p°npy·l·rp zq nzy°p°tzy -Wj . zqu l-p-ty·z āpz w p ~"zo"n-

epz w p	J LJ -x p' r3.	Wj -* .
	loot-tzy zql w x ty" x "p-to" p	
e J I H2	839	; ; 3
e Zb H2	836?	; @
	loot-tzy zq-zot" x l w x tyl·p	
e J I H	839	=3
e Zb H	83 =	? 53-

P nly np -ppy ·sl· ·sp ol'w p-zq nl·tzy p°nsl yrp nl~lnt·á z qāpz w p-čzx l-s p-lyo l w x ty" x μl-p oto yz· -szμ l -tryt nly· ot p°pynp lyo l ty · "y l·sp nzy·py· zq φ "x l·tzy z qāpz w p H μl-l "z" yo =5* φ "·sp·μz ·á-p-zq l-s3 p J LJ ol'w p-z qāpz w p ~"zo"n- -áy·sp-tāpo "tyr

nzx x p°ntl w-zot" x l w x tyl·p φ "·sp lou"-x py· zq·sp Zt4Hw l·tz zq·sp·μz l-s -lx ~w-μp pl "z" yo ?5* 3

Ry·p "p-tyr w l āpz w tnx l·p°tl w-áy·sp-tāpo čzx á l-s lyo l w x ty" x μl-p ~"p-py·po l J LJ ol'w p-839 x p' r3. -tx t w "·z·sl· zml typo ty ·sp ~"p-py· -" oá φ " āpz w p čzx nzlwnz zx l-s lyo āpz w p čzx ~"rl'nlyp l-s f7517? h3

p zml typo p°~p'tx py·l w p-~w-np l "w opx zy- "l·po·sl· l· p' "lw-áy·sp-t- nzyot-tzy ·sp nsl'ln·p°t-tn- zq·sp l-s -lx ~w- -l"·t m p -tāp l Zt lyo Hw l ol' t w p ty ·sp ppo-z nvl tx ~"t tp-lp-n3 oto yz· ty " pynp·sp āpz w tāl·tzy ~"znp-3

P z m t z " -sl· ·sp opn'px py· zq J LJ ol'w p-z qāpz w tnx x l·p°tl w zml typo čzx "p-to" l w w x ty" x μl-p nzx ~l"po ·z nzx x p°ntl w-zot" x l w x tyl·p t- m p l "·p ·sp "p-to" p ~"p-py·- l nzy-top l m p nzy·py· zq l w x ty" x ~pntp- ty n'á-l w p p φ "x -l μs tns l "p ot n" w ·z ot-z w p lyo l w z ~"p-py·-tx ~"t tp-3 l p-top-·sl·l·sp·z·l w l w x ty" x loopo ty ·sp -áy·sp-t-~"znp-μts nzx x p°ntl w-zot" x l w x tyl·p t-z w nt w āpo lyo l ol' t w p 3

p ~"t nl·tzy zql w x ty" x μl-p-μts ~"ws "tn z" sáo "zns w "tn lnto- t- l ~w l m p ·z "px z°p tx ~"t tp- ·z ~"zo" np str s ~"t á āpz w p 3 Oz μ p p°l "ns lnto ·"pl·x py· x trs· np l ypr l·tōp d n-z" φ " āpz w p n'á-l w āl·tzy f6: 188h3 Ry loot-tzy l lnto w l n s tyr r p y p l·p -tryt nly· o z w x p-zq w "to μl-p-·sl· w l o·z l "p w ·tō p w s tr s ~"zo"n-tzy nz-3

83 Ho-z ~tzy Z" otp-

Lnz 2č tpy o w lo-z "npy·-ty n w op·spx l·p°tl w zml typo čzx tyo" -"tl w μl-p "pnzrytāpo l-w μ 2nz -z" "np-3 Hx zyr ·spx lāpz w p-áy·sp-tāpo čzx μl-p-s l°p nzy "x po·s p t° lnt w á·z "px z°p spl o á x p l w n z x ~l"l·tō p w μts yl·"lwz

- f87h X" p"zwt c 3 T z "pyz 1 U 3] x l 1 1 Q J 3 H w -" p 1 H 3
 Op"y yop 1 L 3 S ~p 2 Z z w " 1 H 3 W w y l 1 M 3 75573
 Z 1 y . s p - t - z q 1 p z w p - q " z x n z l w 1 1 - s A l y z o p " o t p u 3
 B y . 3 Q J z l w N p z w 3 : 51968 2 9 7 8 3
- f88h T 1 1 K 3 b l y r 1 e 3 N " z 1 T 3 e s l y r 1 T 3 S t " 1 Q 7 5 6 9 3
 3 p l - t m p n z y o p " - t z y z q - z w o u l - p n i " o t p . l t w y r -
 t y . z s t r s w 1 n 1 - l w t y p 9 H 1 p z w p u t s o l w l m p
 l ~ w n l . t z y 3 b l - p T l y l r 8 9 1 7 8 ; : u 7 8 = 7 3
- f89h O l " d 1 T 3 J t z n i y " 1 N 3 7 5 7 5 3 3 L n z 2 q t p y o w 1
 y l y z 2 o - z " m p y . - q " ~ z w 1 . l y . " p x z o l w q " z x
 u l - p u l . p " - 3 B y A R s l " t - z o l V 3 T 1 " . y p 1 S 3
 R s l " t - z o I 3 - p o - . 3 O l y o m z z v z q U l y z x l . p " d l w l y o
 U l y z n z x ~ z - t - p - q " L y p " r 1 l y o L y o t " z y x p y . l w
 H ~ w n l . t z y - 3 Z u t 1 p " w y o H N A Z ~ " t y r p " 3
- f8: h K t y 1 H 3 T 3 O l x p p o 1 I 3 O 3 7 5 6 5 3 3 H o - z " ~ - t z y z q
 x p s 1 w o t z w . o 1 p z y l n t o x z o t p o l n - t o l . p o n l " m z y A
 t - z . s p " x - l y o . s p " x z o 1 y l x t n - 3 Q H ~ w 3 Z n t 3 t y
 L y o t " z y 3 Z l y t . 3 : 6 ; 6 2 6 = 5 3



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