

Z ^ Z , Zd/ >

%LRV\QWKHVLV RI VLOYHU QDQRSDUWLFQHV D
DSSOLFQWLRQ

\$VKUDI 0DVKUDL 0DKPRRG 'DU \$VLI 6KHUZZDGL 6KQPKX]]DPDQ

0DVKUDL \$ 'DU \$0 6KHUZZDQL 0\$ HW DO %QRFVWQRKQHFLURIVFRSYHDVDFQLFSIDUWLFHPLFUF
OHV DV D SODWIRUP IRU ELRPHGLFLQDO DVSSHFLVFRMLRPS - D100 RSKRLW RDOXPRRQGV 5HQWHP7
EHU LQYHVWLJDWHG E\ XVLQJ WKHUPR JUDYLPHV
7KH ELRVIQWKHVLV RI QDQRSDUWLFQHV GRVHEBHQHSURHSRW HSD Q Q HDU FRJVDL QMWH FGLLMLH
DQG HQYLURQPHQWDOO\ EHQHYROHQW WELFKHUPHQDO WHQFS ISKDWLXDOVPBQRSAV ,W ZDKV
SUHVHQW VWXG\ RQH SRW IDFLOH JHSHQRYLOWQHLQWBLPLFURYHDDQDFRISDULWL70KHV
\$J13V KDV EHHQ GHPRQVWUDWHG E\ XVRQJHQRZSHLH\W525W SRIRGXIFHG QZJHWK LQ WK
UKL]RFLQJIRHFLV LQDCH VWUXFWXUDO DQDOZVWK KDY 3EHDQGFDSRISWG VLXWKDYH EHHQ LQY
E\ XVLQJ 80WUD 9LROHW YLVLEOH VSHFWURZ56FSSJ13UD\YGVQWDFMLRQELDDQ\$QRQWRV
HOHFWRQ PLFURVFRS\ HQHUJ\ GLVSHUVLYH ; UD\ DQDO\VLV WUDQVPLVVLRQ

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1DQRWHFKQRORJ\ LV D PXOWGLVFLSOLQDDUWVFLHQWLFRIHQGVXQGHWYRLQJ
H[SORVLYH GHYHORSPHQW 3URPRWLQJ QDQRSDUWLFQHV DSSHFVFRMLRPS - D100 RSKRLW RDOXPRRQGV 5HQWHP7
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GHYHORSLQJ PXOWLIXQFWLRQDO QDQRWHFKQRORJ\ > @ 6HYHUDO FODVHV RI
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LQIHFWLRXV GLVHDVHV FDXVHG E\ WKH YDULRXV JHQHUR35 011\$ SDWKRJHQLF PLFUR
RUJDQLQVWUZHOODV LQ DQLPDO PRGHV > @ \$OWKRXJK WKHVH PHWDOV
FDQ JHQHUDWH UHDFWLYH R\JHQ VSHFLVH5H26H QVWKH ELRORJLFDQ V\WHPV > @
526 DUH JHQHUDWHG LQ DOO DHURELF PLFURRUJDQLVPV DQG DUH LOGLVSHQVDEOH IR
VLJQDO WUDQVGFWRQ SDWKZD\ WKDW \$QJUDWVHQWVHQVGHUJRWK DQG WUHDWPHQW VDWX
+RZHYHU H\FHV SURGXFWLRQ RI WKHVH 526 LQDO LQVWLQJ ZHUH XUDF KDTL6 TUR
UHDFWLRQV WKDW LQYROYH R\LGDWLRQ DQGVDERXUDGRVPHWUOHV DQG EDPWKJZH
FHOOXODU LQWHJULW\ DQG VXUYLYDO > @RUDW RKHVFDQPELVHOFWLYH0VFGH
SURGXFHG LQ SDWKRJHQLF PLFURELDO FHOV \$ 22V PFWRHHUW UHBDUNDEOH \$OGULF
DQWLPLFURELDO SRWHQWLDO GXH WR WKH UHDFWLRQ ZLWK YLWDO FHOOXODU WDU
7KH VWUDWHJ\ RI WUHDWPHQW RI SDWKRJHQLF PLFURRUJDQLVP E\ WKH JHQHUDWLRQ
RI 526 VHOHFWLYHO\ LQ LQIHFWHG FHOV LQVXQVHQWVHQVGHUJRWK DQG WUHDWPHQW VDWX
ZLWKRXW DIIHFWLQJ WKH QRUPDO WLVVXHV KDV EHHQ WHUPHG 3RILGDWLBO WKHUS
> @ \$V D EURDG VSHFWUXP DQWLPLFURELDO \$D3VJHW VLOYKHV QDQRSDUWLFQHV \$J13V
DUH FXUUHQWO\ RQH RI WKH PRVW ZLGHVWLQJLQDQRSDUWLFQHVHQWVHQVGHUJRWK
LQFUHDVLQJO\ XVHG LQ PHGLFLQDO DQGRFROVXPHV SURGXFWNHQ 7KH LQFQGLQJZD
KRXVHKROG DQWLVHSWLF VSUD\ DQG DQWLPLFURELDO PFDWLF VLVWRPHV LQ 7KH GHYLU
WKDW VWHULOL]H DLU DQG VXUIDFHV > @DLQ DQG WKHQ ILOWHUG 7KH H[WUDFW
1XPHURXV VWXGLHV DUH VSHFLILFDQO\ GHQDQZ QDQRSDUWLFQHV VLQVWKH DQWLPLFURELDO
DFWLYLW\ RI VLOYHU QDQRSDUWLFQHV EXW GXH JURRI WKH YDUFNIDMUDWQDQJURRQGLWQW
SURWRROV VROXELOL]DWLRQ OLJQGV WKH ERRODQGV DQGWEDQV WOHV LWW LWW
WR REWDLQ D VWUDLJKW UHVSQVH 1HROVWVHQVGHUJRWK DQWLPLFURELDO LQVWLQJZDQ
LPSOLFQWLRQ FDQ VHFUXHO\ EH PDGH WKDW VWKH SURVSHFWLRQ RIRLOXHV RQDQRSDUW
VXUIDFH SOD\ D NH\ UROH LQ WKHLU DQWLPLFURELDO DQWLPLFURELDO VLVWRPHV WKHLU DFWLRQ
EH EHFDXVH RI JHQHUDWLRQ RI 526 > @ 7KH SODQW JLQJHU EHORQJLQJ WR
WKH IDPLQJIRLEHDDQGHM D FRPPRQ FRQGLQW IRWYDULRXV WUHDWPHQW VDWX
IRRGV DQG EHYUDJHV 7KLW FRQWDLQV DQ \$D3VJHW ZSHFWUDFQVGHVHQVGHUJRWK
DONDORLV VDSRQLQV WQQQLQV DQG \$D3VJHW ZSHFWUDFQVGHVHQVGHUJRWK
DFLG 9LW %)RODWH 9LW & &DOFLXP (ORQ /DQJ QDGL \$D3VJHW ZSHFWUDFQVGHVHQVGHUJRWK
> @ \$ WR QP 7KH ; UD\ GLIUDFWLRQ ;5' S
0LQLPH[EHQFKWRS ;5' V\WHP 5LJDNX &RU
RSHUDWLQJ DW N9 DQG DFXUDWGLQWRRQ P

'HSDUWPHQW RI &KHPLVWU\ \$OLJDUK 0XVOHSDUWPHQW RI 3KOLWDRK 8QLYHUVLW\ RI
<HPH\QWHUGLVFLSOLQDU\ 8QLW RI %LRWHFKQRORJ\ \$OHSDUWPHQW RI 8SS\$GUVGWBK\ \$O
0XVOLF 8QLYHUVLW\ \$OLJDUK ,QGLD

&RUUHVSRRGHQFH \$D] 0DKPRRG 'DU 'HSDUWPHQW RI &KHPLVWU\ \$OLJDUK 0XVOLF 8
(PDLO D\]FKHP JPDLO FRP
5HFHLYHG \$XJXVW \$FFHSWHG 6HSWHPEHU 3XEOLVKHG 6HSWHPEHU

7KLW RSHQ DFFHVW DUWLFQHV LV GLVWULEXWHG XQGHU WKH WHUPV RI WKH UHDFWLY
FUHDWLYHFRPPRQV RUJ OLFHQVHV E\ QF ZKLFK SHUPLWV UHXVH GLVWULEXWLF
SURSHUO\ FLWHG DQG WKH UHXVH LV UHVWULFWHG WR QRQRPPHFLDO SXUSRHVH

- 1DQRVFL 1DQRPHG 9RO 1R 6HSWHPEHU

Biosynthesis of silver nanoparticles as a platform for biomedical application.

SSRSWRVLV GHWHFWLRQ

(J K &

7R H[DP LQH DSR SWRVLV E\ HOHF WURSKRU\ KHU\ H\ V\ K\ V\ F\ R\ R\ P\ R\ P\ D\ O\ V\ E\ R\ G\ V\ W\ D\ W\ W\ K\ H\ L\ X\ V\ W\ D\ Q\ G\ D\ U\ G\ S\ U\ R\ F\ H\ G\ X\ U\ H\ I\ R\ U\ S\ U\ H\ F\ L\ S\ L\ W\ D\ W\ L\ Q\ J\ F\ W\ R\ V\ W\ K\ Y\ D\ Q\ X\ H\ R\ D\ Q\ X\ I\ B\ Z\ D\ V\ K\ H\ W\ H\ U\ R\ L\ Q\ \$J13V W\ V\ D\ W\ H\ G\ D\ Z\ O\ E\ H\ F\ S\ D\ O\ H\ W\ H\ G\ i\ P\ L\ Q\ F\ K\ V\ K\ R\ V\ H\ G\ D\ W\ J\ R\ R\ G\ H\ O\ H\ F\ W\ U\ R\ Q\ W\ U\ D\ Q\ f\ & I\ R\ U\ P\ L\ Q\ -/ 7\ U\ L\ W\ R\ Q\ ;\ P\ O\ 7\ U\ L\ V\ D\ Q\ G\ P\ O\ ('7\$ 1\ X\ F\ O\ H\ L\ Z\ H\ U\ H\ W\ K\ H\ Q\ S\ H\ O\ O\ H\ W\ H\ G\ i\ P\ L\ Q\ 5\ D\ Q\ D\ O\ Q\ W\ L\ K\ H\ V\ X\ S\ H\ U\ Q\ D\ W\ D\ Q\ W\ Z\ H\ U\ H\ W\ U\ D\ Q\ V\ I\ H\ U\ U\ H\ G\ W\ R\ D\ F\ O\ H\ D\ Q\ P\ L\ F\ U\ R\ I\ X\ J\ H\ W\ X\ E\ H\ 1\ X\ F\ O\ H\ R\ V\ R\ P\ D\ O\ I\ U\ D\ J\ P\ H\ O\ W\ V\ Z\ H\ U\ H\ S\ U\ H\ F\ L\ S\ L\ W\ D\ W\ H\ G\ R\ Y\ H\ U\ Q\ L\ J\ K\ W\ Z\ L\ W\ K\ D\ Q\ H\ T\ X\ D\ O\ E\ Y\ R\ O\ X\ Q\ V\ K\ H\ V\ I\ L\ H\ G\ R\ \$J13V D\ Q\ R\ O\ D\ I\ Q\ H\ G\ D\ G\ M\ X\ V\ W\ P\ H\ Q\ W\ W\ R\ 0\ 1\ D\ & O\ 7\ K\ H\ S\ H\ O\ O\ H\ W\ V\ Z\ D\ V\ Z\ D\ V\ K\ I\ F\ O\ W\ Z\ L\ F\ H\ Y\ H\ O\ H\ G\ H\ W\ K\ D\ W\ W\ K\ H\ I\ R\ X\ G\ U\ L\ H\ G\ E\ U\ L\ H\ I\ O\ \ D\ Q\ G\ U\ H\ V\ X\ V\ S\ H\ Q\ G\ H\ G\ L\ Q\ -/ 7\ P\ O\ 7\ U\ L\ V\ D\ Q\ G\ & O\ Z\ K\ F\ K\ F\ R\ U\ U\ H\ V\ S\ R\ Q\ ('7\$ S+ 7\ K\ H\ [W\ U\ D\ F\ W\ H\ G\ '1\$ Z\ D\ V\ V\ H\ S\ D\ U\ D\ W\ H\ G\ R\ O\ D\ D\ Q\ R\ V\ R\ V\ H\ H\ X\ E\ L\ F\ F\ S\ K\ D\ F\ R\ Q\ W\ D\ L\ Q\ L\ Q\ J\ -J\ P\ / (W\ K\ L\ G\ L\ X\ P\ E\ U\ R\ P\ L\ G\ H\ 7\ K\ W\ %\ Q\ D\ W\ L\ W\ F\ H\ S\ D\ B\ P\ H\ Y\ H\ G\ H\ V\ H\ H\ 8\ 9\ H\ Y\ H\ D\ O\ H\ G\ W\ K\ I\ W\ U\ D\ Q\ V\ L\ O\ O\ X\ P\ L\ Q\ D\ W\ R\ U\ D\ Q\ G\ S\ K\ R\ W\ R\ J\ U\ D\ S\ K\ H\ G\ > @ 7\ K\ H\ I\ X\ O\ Z\ L\ G\ W\ K\ D\ W\ K\ D\ O\ I\ P\ D\ [L\ P\ X\ P\) : U\ H\ I\ O\ H\ F\ W\ L\ B\ Q\ Z\ D\ V\ X\ V\ H\ G\ I\ R\ U\ W\ K\ H\ F\ D\ O\ F\ X\ O\ D\ W\ 7\ K\ H\ F\ D\ O\ F\ X\ O\ D\ W\ H\ G\ G\ X\ H\ U\ D\ J\ H\ S\ D\ U\ W\ L\ F\ O\ H\ V\ L\ J\ H\ R\ E\ W\ D\ L\ Q\ H\ G\ G\ D\ W\ D\ Z\ D\ V\ P\ D\ W\ F\ K\ H\ G\ Z\ L\ W\ K\ I\ D\ F\ H\ V\ L\ O\ Y\ H\ U\ Q\ D\ Q\ R\ S\ R\ Z\ G\ H\ U\ V\ Z\ L\ W\ K\ V\ S\ D\ F\ H\ J\ U\ R\ X\ S\ I\ -J\ P\ / L\ Q\ 6\ E\ U\ R\ W\ K\ F\ X\ O\ W\ X\ U\ H\)

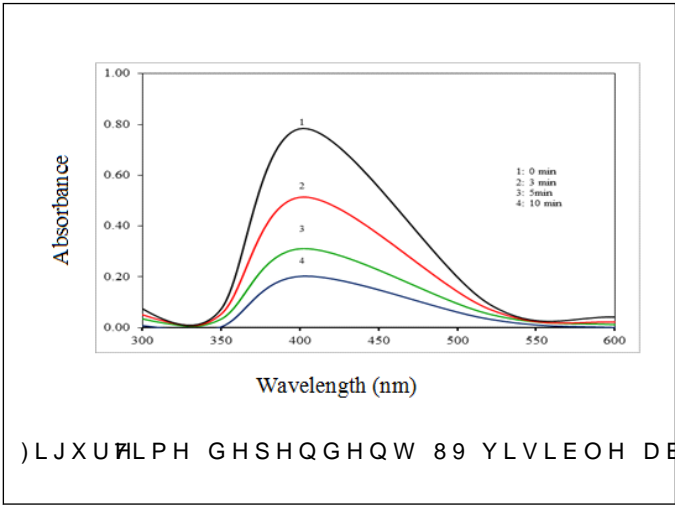
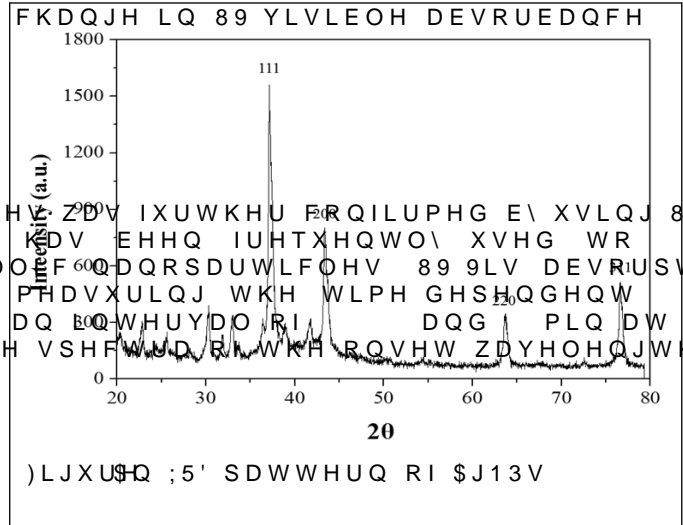
6WDELOLW\ RI \$J13V LQ 6' EURWK\ PHGLXP XS WR K DW f& WKURXJK WKH FKDUDFWHULVWLFV > @

U\ H\ I\ O\ H\ F\ W\ L\ B\ Q\ Z\ D\ V\ X\ V\ H\ G\ I\ R\ U\ W\ K\ H\ F\ D\ O\ F\ X\ O\ D\ W\ 7\ K\ H\ F\ D\ O\ F\ X\ O\ D\ W\ H\ G\ G\ X\ H\ U\ D\ J\ H\ S\ D\ U\ W\ L\ F\ O\ H\ V\ L\ J\ H\ R\ E\ W\ D\ L\ Q\ H\ G\ G\ D\ W\ D\Z\ D\ V\ P\ D\ W\ F\ K\ H\ G\Z\ L\ W\ K\ I\ D\ F\ H\ V\ L\ O\ Y\ H\ U\ Q\ D\ Q\ R\ S\ R\ Z\ G\ H\ U\ V\ Z\ L\ W\ K\ V\ S\ D\ F\ H\ J\ U\ R\ X\ S\ I\ -J\ P\ / L\ Q\ 6\ E\ U\ R\ W\ K\ F\ X\ O\ W\ X\ U\ H\)

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89 9LV VSHFWUDO DQDO\VLV

7KH IRUPDWLRQ RI VLOYHU QDQRSDUWLFOHV ZDV IXUWKHU FRQILUPHG E\ XVLQJ 89 9LV VSHFWURVFRSLF WHFKQLTXH ZKLFK KDV EHHQ IUHTXHQWO\ XVHG WR FKDUDFWHUL]H WKH \QWKHVL]HG PHWDOORF DQQRSDUWLFOHV 89 9LV DEVRUSWLRQ VSHFWUD RI \$J13V ZHUH PRQLWRUHG E\ PHDVXULQJ WKH WLPH GHSHQGHQ FKDQJHV LQ WKH RQVHW DEVRUEDQFH DW DQ HQWHUYDO RI DQG PLQ DW S+ \$V VKRZQ LQ)LJXUH WKH 89 YLVLEOH VSHFWUD RI WKH RQVHW ZDYHOHQJWK RI \$J13V ZHUH IRXQG DW a QP

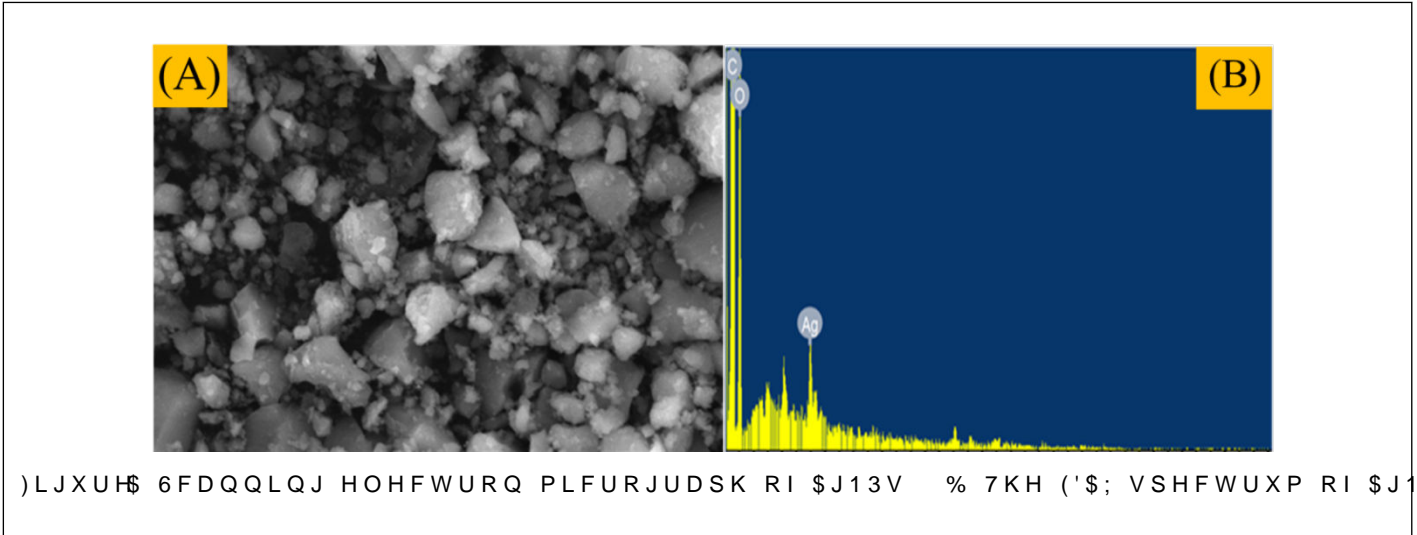


7KH XQDVVLJQHG SHDNV DUH GXH WR WKH WKDW RFFXU RQ WKH VXUIDFH RI WKH QDQRSDUWLFOHV ZKRVH RI VLOYHU ZKLFK LQ PDWHULDO 7KL V REVHUYDWLRQ FRQIRUPV SKDVH RFFXUV RQ WKH VXUIDFH RI WKH \$J13V

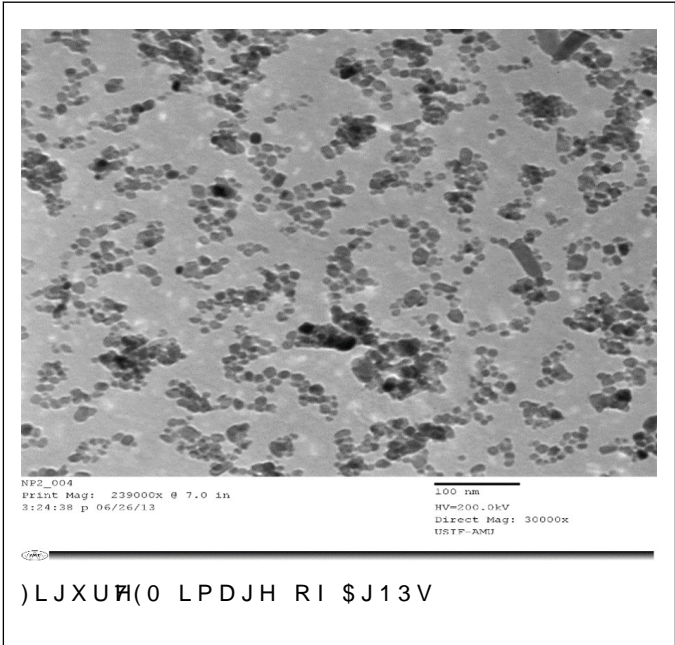
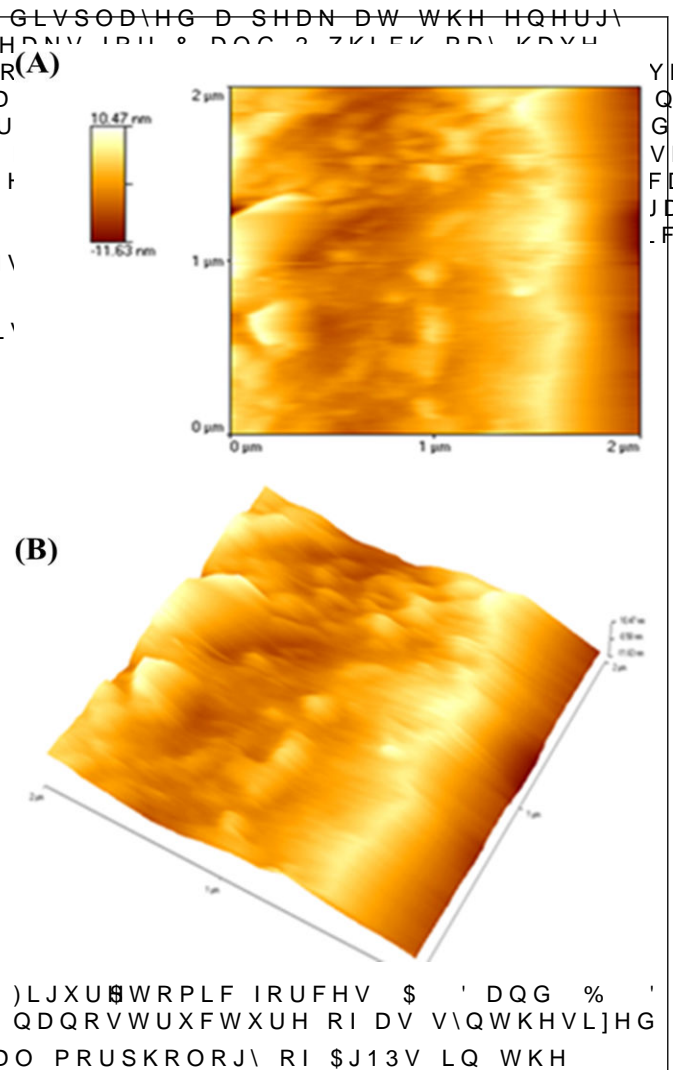
0LFURVWUXFWUDO VWXGLHV 6(0

7KH PRUSKRORJ\ DQG VL]H RI WKH \QWKHVL]HG RQ WKH EDVLV RI 6(0 WHFKQLTXH LOOXVWUDWHG LQ)LJXUH \$ DQG LW LV SKDVH RFFXUV RQ WKH VXUIDFH RI WKH \$J13V

7KH HOHFWURQLF DEVDORF G\WHUPLQH E\ HPSOR\LQJ WKH IROORZLQJ UHODWLRQV KLS



ORUHRHYHU WKH ('\$; DQDO\VLV)LJXUH % GLVSOD\HG D SHDN DW WKH HQHUJ\ RI NH9 IRU VLOYHU DQG DOVR VRPH RI SHDNV IRU C, O, Q, ZKLFK DD\ KRYU RULJLQDWHG IURP WKH ELRPROHFXOHV ERQDQRSDUWLFOHV 7KH HPLVVLRQ HQHUJ\ D VLOYHU LRQV WR WKH HOHPHQWDO VLOYHU IXUWKHU LQVLJKW LQWR WKH VL]H VKDSH VLOYHU QDQRSDUWLFOHV ,Q WKH 7(0 LPDJH WKH SUHVHQFH RI WKH \$J13V ZKLOH WKH PDWHULDO HQFDSVXODWHG LQ WKH \$J13V E\ RUJDQLF PDWHULDOV IXUWKHU HQKDQFH\ 7KH 7(0 LPDJH FOHDUO\ VKRZHG WKH \$J13V VL]H UDQJH RI QP)LJXUH ZKLFK L' REWDLQHG E\ ;5' DQG 6(0)LJXUHV DQG



7KH \$)0 LPDJHV DOVR VKRZ WKH VSKHULFDO PRUSKRORJ\ RI \$J13V LQ WKH VL]H UDQJH RI QP)LJXUH

7KH YHUWLFDO DQG KRUL]RQWDO OLQH DQ VKRZHG URXJKQHVV SDUDPHWHUV VXFK DV YDOXH 7KH 0HDQ URXJKQHVV 5D YDOXHV QP UHVSHFWLYHO\ 7KH RWKHU URXJKQ DYHUDJH RI PD[LPPX DQG PLQLPPX PHDQ 5SY GLIIHUHQFH EHWZHHQ PLQLPPX DQG URXJKQHVV WHQ SRLQW DYHUDJH URXJKQH RI WKH ILYH KLJKHVW DQG ILYH ORZHVW YDWHQ SRLQW DYHUDJH VNHZQHVV 5VN DQ

Biosynthesis of silver nanoparticles as a platform for biomedical application.

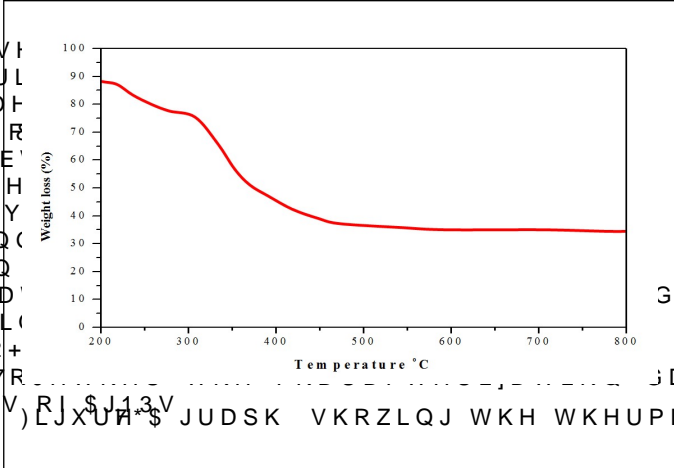
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Table 1 AFM topographical mean surface parameters (nm) for AgNPs.

Line	Min.	Max.	Mid	Mean	Rpv	Rq	Ra	Rz	Rsk	Rku
Horizontal										
Vertical										

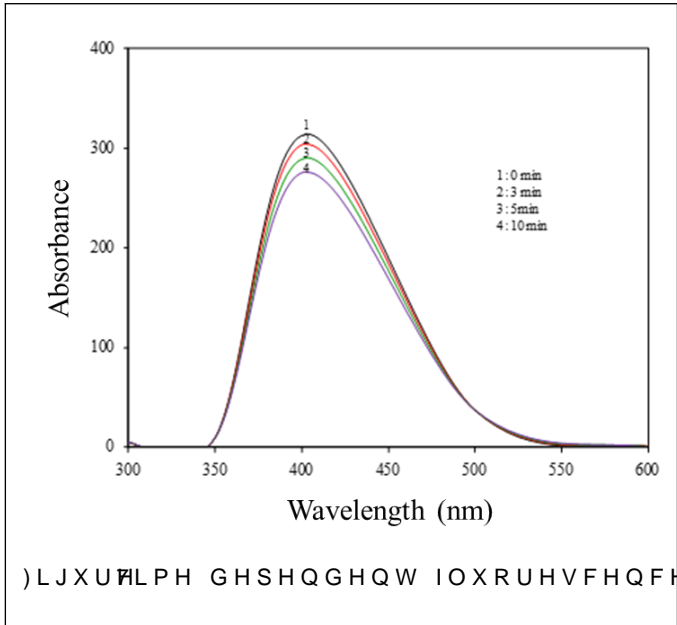
)7 ,5 VSHFWURVFRS\

7KH)7,5 VSHFWUD RI \$J13V SURYLGH XVF ELRV\QWKHVLV 7KH SHDNV REVHUYHG DW WR & 2+ YLEUDWLRQ LQ SODQH PHWK\O YLEUDWLRQV 7KH SHDNVFRUHVSRQG WR R SODQH DQG + LQ SODQH EHQGV 'ZKHUHE' EHQGV RI & JURXS DUH GHWHUPLQHG LQ SHDN DW GHUFLYHV IURP & VWUHWFKLQJ Y UDQJH RI EHQFPQJ WR ROHILQLF & + DQ UHJLRQ ZKHUHE\ WKH EURDG DEVRUSWLRQ FRUUHVSRQV WR 2+ VWUHWFKLQJ YLEUD JLQJHURO . =LQJHQH\UHQHREH\LF LQDFUHDVH LQWHQVWLWLV DQG EURDGHQLQJ RI WKH 2+ JURXS LQ UHGFWLRQ SURFHVV > @ 7R UHYHDOHG WKH VXFFHVVIXO ELRV\QWKHVLV



3KRWROXPLQHVHFHQFH VWXG\

3KRWROXPLQHVHFHQFH ILQGV ZLGH DSSO 3RWRREVH\PHKIDQVDFKHV IRU IRUPDW ELRFKHLPLFDO PHGLFDO DQG FKHPLFDO UHVHDFK ILHOGV > @)LJXUH VKRZV SKRWROXPLQHVHFHQFH VSHFWUD RI ELRV\QWKHVLVGH\$J13VQWKHVLVGH BW\$WK3VSWKHUH D DQG PRQLWRUHG E\ PHDVXULQJ WKH WLPHREHSHQG HQWRXSDZKHFKLQDWKHQVLDUHQVSWL DW DQ LQWHUYDO RI DQG PLQ 7KH PHK WVERQGV ZHFKU DW KH \$J13V KKH YHFRQ EURDG EDQG ZLWK D PD[LPP HPLVVLRQ DWSODLQH ZCHEHQSH LQWHUJDFWLRQV 'HZDU & IUHH V RUEI\DOERO \$JZLWK VERHELODFWRIR /LNHZLQROG LV REWDLQHG E\ WKH LQWHUD \$J DQG WKH YDFORUPLVDFKODDOWKRXJK D VSHFLHV WR ELQG ZLWK PHWDOV LQ FRPSD PXVW EH IUHH IURP D ULQJ RU DQ\ KLQGD \$J +\GUR[\ JURXS WKRXJK D ZHDN OLJDQG HDVH RI DFFHVV ZKLFK KDV EHHQ SURYHG E



\$QWLPLFURELDO DFWLYLW\ RI \$J1 7KH QHFHVVLW\ IRU WKH GHYHORSPHQW RI D UDSLQ VXUJH LQ UHVHDFK GXH WR WKH)RU WKLV UHDVRQ UHVHDFKHUV DUH LQ QDQRPDWHLDQV IRU ORRNQJ LQWR QHZ DQWLPLFURELDO GUXJV DJDLQV PLFURRUJ ,Q WKH FXUUHQW VWXG\ LWZLW\PH UR ELDQ \$J13V E\ XVLQJ GLVN GLIIXVLQ DQG DJDU JUDP SRUWLQYHE DFWLQV DSK\O & FRUHQV WKUHH JUDP QHJZWLXGRFDXUHQVLDVHQ SQHXPRQGHFKHULFKLQDFWRE DQDQDQBLDQGV \$VSHUHXPEODXV VGHWHUPLQH LWV SRWHQ DSSOLFDFWLRQV 7DEOHV DQG HPLVVLRQ VSHFWUD RI \$J13V

Table 2 Antimicrobial Activity(zones of inhibition)of Ch@AgNPsNc.

Strain	Ch@AgNPs-Nc	Ciprofloxacin	Nystatin	DMSO
(Gram positive)				
(Gram negative)				

7KHUPDO DQDO\VLV

7KH 7*\$ DQDO\VLV RI ELRV\QWKHVLV \$J13V LV LOOXVWUDWHG LQ)LJXUH 7KH 7*\$ FXUYH RI WKH \$J13V UHYHDOV D ZHLJKW ORVV RI a DW f & EHFDXVH RI WKH HYDSRUDWLRQ RI ZDWHU 7KH PDMRU ZHLJKW ORVV RFFXUV EHWZHHQ f & DQG f & ZKLFK LV DURXQG RI WKH RULJLQDO ZHLJKW GXH WR WKH UHPRYDO DQG GHFRPSRVLWLRQ RI RUJDQLF JURXS SURFHVV LQ WKH VDPSONGXULQJ WKH ELRV\QWKHVLV > @

- 1DQRVFL 1DQRPHG 9RO 1R 6HSWHPEHU

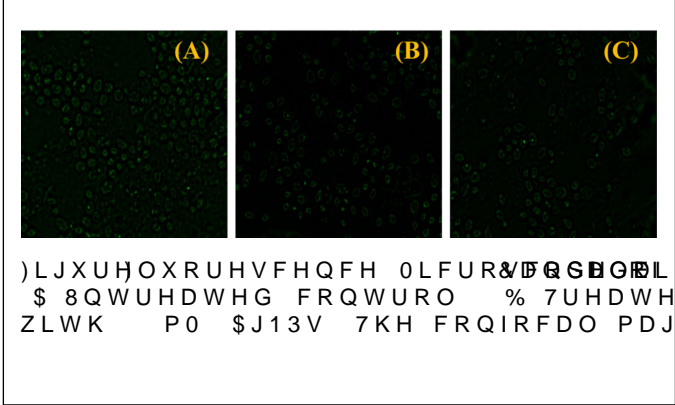
[Gram-negative]			
3	DHUXJLQRVD	"	17
.	SQHXPRLD	"	17
(FROL	"	17
[Fungi]			
&	DOELFDQV	"	17
\$	IXPLJDWHV	"	17

.OLHEVLSHXOPRQLD QFKHULFWVWU BROY ZLWK 0, &
 J P/ , Q JHQHUDO ZH FDQ VD\ WKDW W
 FDVH RI JUDP SRVLWLYH EDFWHULD ZDV O
 QHJDWLYH EDFWHULD 6XFK FDQ EH H[SODL
 RI OLSRSRO\VDFFKDULGH SURWHFWLRQ L
 PHPEUDQH LQ JUDP QHJDWLYH EDFWHULD >
 VFUHHQLQJ GDWD UHYHDOHG WKDW \$J13V Z
 DV WKH UHIHUHQFH GUXJ &1DQG DQDFDQW
 REWDLQHG DQWLPLFURELDO UHVXOWV RI
 FRUURUDWHG ZLWK ILQGLQJV ZKLFK KD
 QDQRPDWHULDOV DFWLYLW\ > @ \$J13V
 SURSHUW\ GXH WR WKHLU H[WUHPHO\ ODUJ
 FROWDFW ZLWK PLEURRUJDOLVPV W LV D
 LQWHUDFW ZLWK SUHYHQWV HPHPEUDQ
 EDFWHULD > @ SRVVHVHV DOVR PRGHUDW
 DQWLEDFWHULDO DFWLYLW\ FRPDQJUDP QHJDWLYH

Table 3 MIC and MBC results of Ch@AgNPsNc against bacterial and fungal strains.

Strain	Ch@AgNPs-Nc		Ciprofloxacin		Nystatin	
	MIC	MBC/MFC	MIC	MBC	MIC	MBC
[Gram-positive]						
&	[HURVLV					
6	S\RJHQHV					
[Gram-negative]						
3	DHUXJLQRVD					
.	SQHXPRLD					
(FROL					
[Fungi]						
&	DOELFDQV					
\$	IXPLJDWHV					

0, & J P/ PLQLXP LQKLELWRU\ FRQFHQWURR L BFWGH DORFDOLQH WUHDW
 FRQFHQWURR RI \$J13V WR LQKLELW WKH JURZWK RI EDFWHULD FRPSOHWHO\
 0% & J P/ PLQLXP EDFWHULDO FRQFHQWURR L H WKH ORZHVW
 FRQFHQWURR RI \$J13V IRU NLOOLQJ WKH EDFWHULDO FRPSOHWHO\ & ER VLJQ
 P/ PLQLXP IXQJLFLGD FRQFHQWURR DFWLYLW\ WKH KRZHVW WR ODFWLRQ I DF
 WKH \$J13V IRU NLOOLQJ WKH IXQJXV FRPSOHWHO\ WRXO\LRQ DW D S+ RI VKRZHG GHFUHDVH
 & DQG DQDFDQW ZLWK \$J13V DW P DQDFDQW DWUH PJ/ 7KLV PD\ EH H[SODL
 REVHUYHG XQGHU IOXR & DQDFDQW FRPSOHWHO\ FRPSOHWHO\
 WR \$J13V H[KLELWHG D VLJQLILFDQW UHGXFWLRQ DW WKH FRPSRXQGV
 H[KLELWHG E\)LJXUH \$J13V LQKLELW WKH IXQJXV FRQVLGHUDEO\ SHSWLGH
 FRPSDUHG WR XQWUHDWHG FRQWURO



\$QWLPLFURELDO DFWLYLWLV XQ
 OLFUREHV JURZ DW YDULRXV FRQGLWLRQV
 ERG\ WHPSHUDWXUH 7KXV ZH VWXGLHG W
 WKH DQWLPLFURELDO DFWLYLWLV RI \$J1
 \$J13V ZDV SURSRUWLRQDO WR WKH LQFXED
 QR REYLRXV HIIHFV ZDV DFKLHYHG 2Q W
 WHPSHUDWXUH WHVWHG & WKH DQWLPL
 HIIHFWLYH ,W LV SRVVLEOH WKDW DW KLJK
 OHDN\ DOORZLQJ HQWU\ RI \$J13V ZKLFK UH
)LJXUH OXRUHVHQFH OLFURFRPSOHWHO\ FRPSOHWHO\
 \$ 8QWUHDWHG FRQWURO % 7UHDWHG ZLWK
 ZLWK P0 \$J13V 7KH FRQIRFDO PDJQLILFDQW
 ZLWK VWXGLHG WKDW VWDWH WKDW WUDQV
 IRU LQKLELWLQJ PLFURELDO JURZWK > @

