FIG. 1

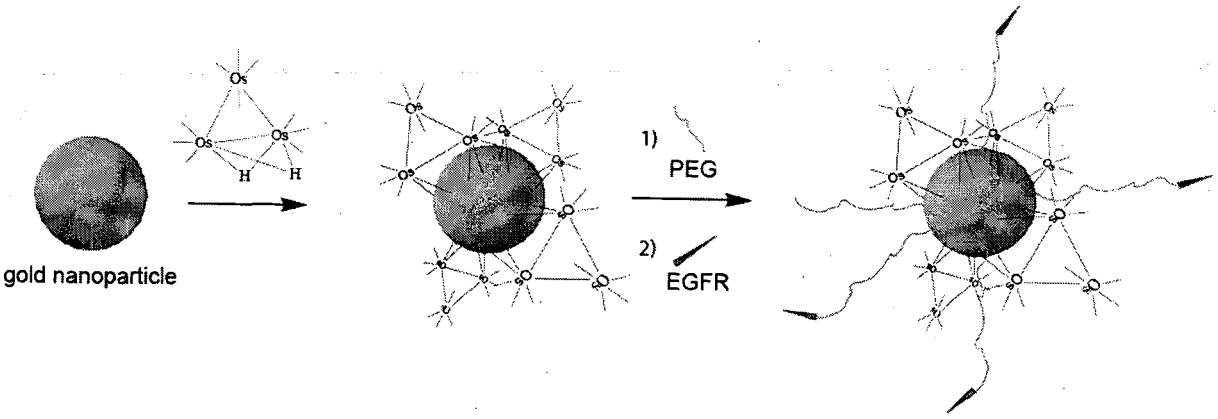

gold nanoparticle
1)
PEG
2)
EGFR

FIG. 2

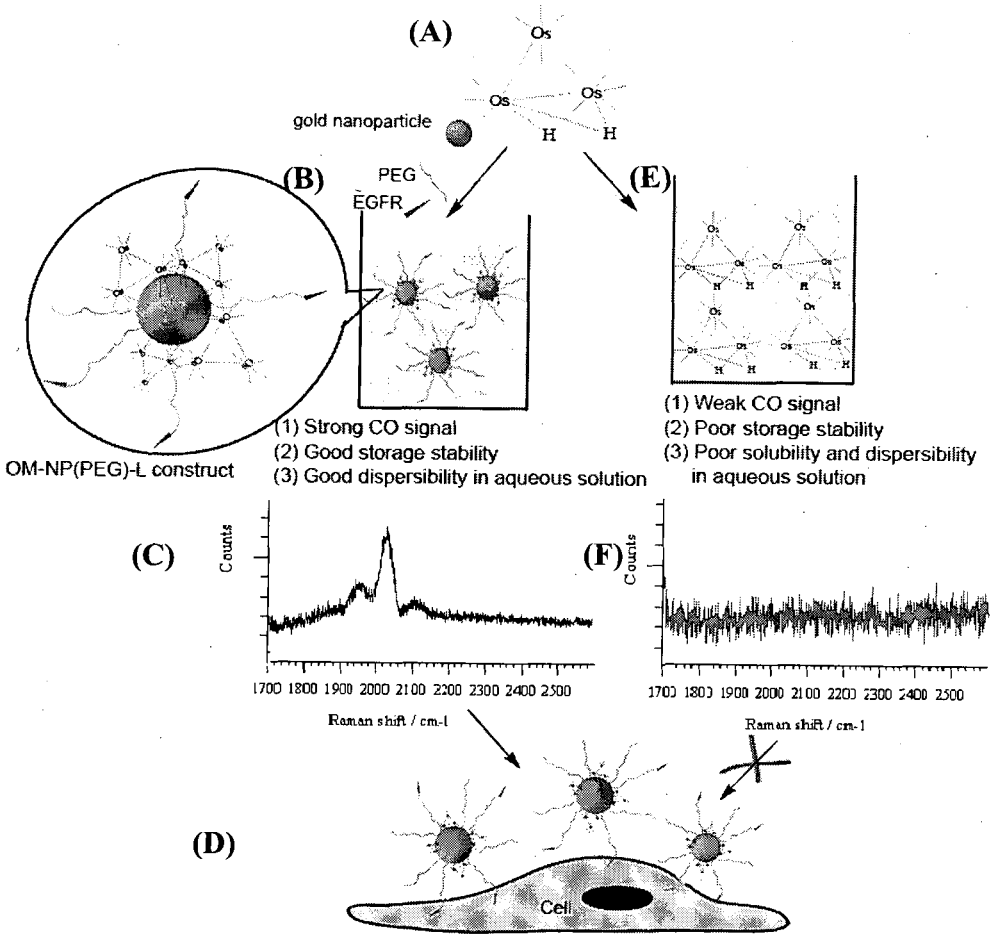
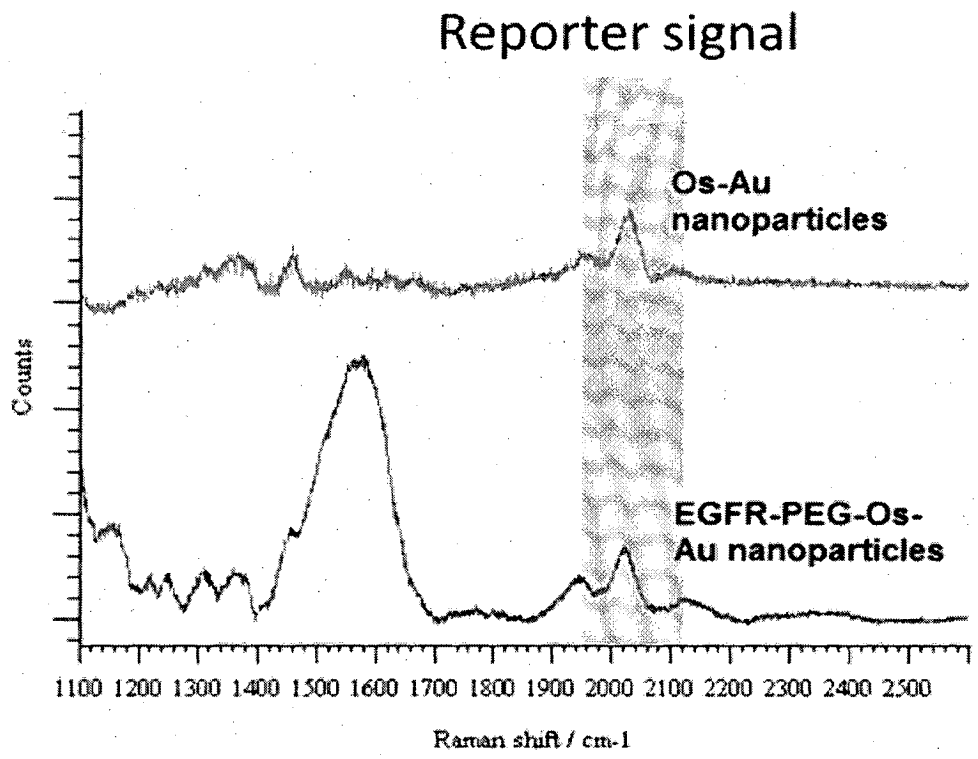

(A)
gold nanoparticle
(B)
PEG
EGFR
(E)
OM-NP(PEG)-L construct
(1) Strong CO signal
(2) Good storage stability
(3) Good dispersibility in aqueous solution
(1) Weak CO signal
(2) Poor storage stability
(3) Poor solubility and dispersibility in aqueous solution
(C)
(F)
Counts
1700 1800 1900 2000 2100 2200 2300 2400 2500
Raman shift / cm-1
(D)
Cell

FIG. 3

(A)


Reporter signal
Os-Au nanoparticles
EGFR-PEG-Os-Au nanoparticles
Counts
1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500
Raman shift / cm-1

(B)

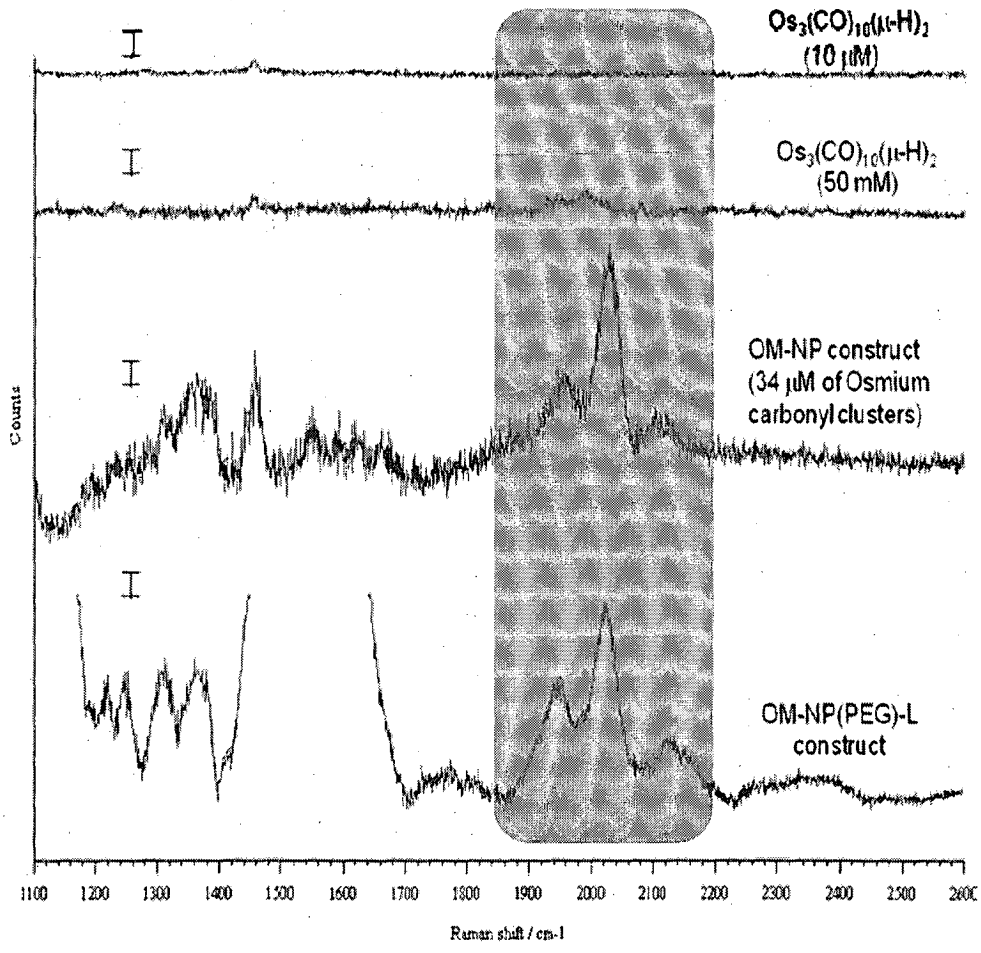

$Os_3(CO)_{10}(\mu-H)_2$ (10 μM)
$Os_3(CO)_{10}(\mu-H)_2$ (50 mM)
OM-NP construct (34 μM of Osmium carbonyl clusters)
OM-NP(PEG)-L construct
Counts
1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600
Raman shift / cm-1

FIG. 4

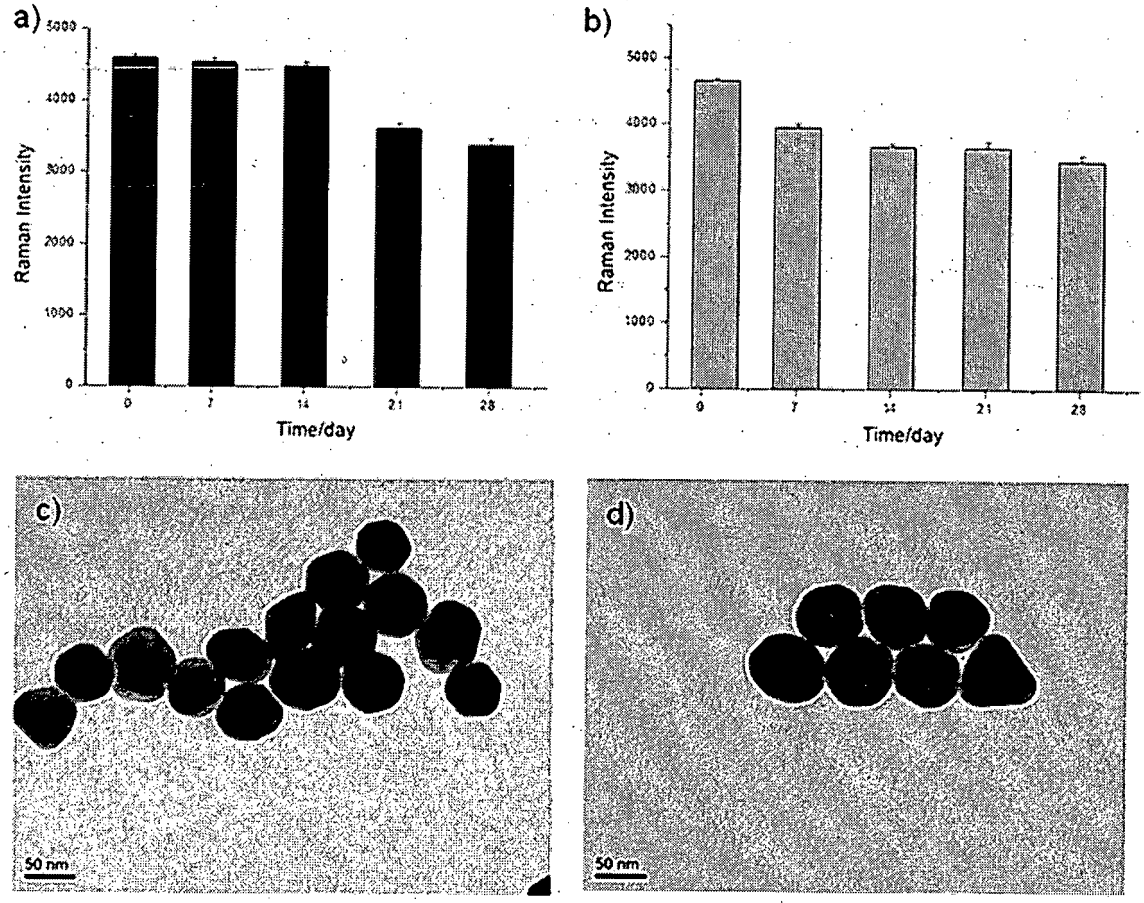

a)
Raman Intensity
Time/day
b)
Raman Intensity
Time/day
c)
50 nm
d)
50 nm

FIG. 5

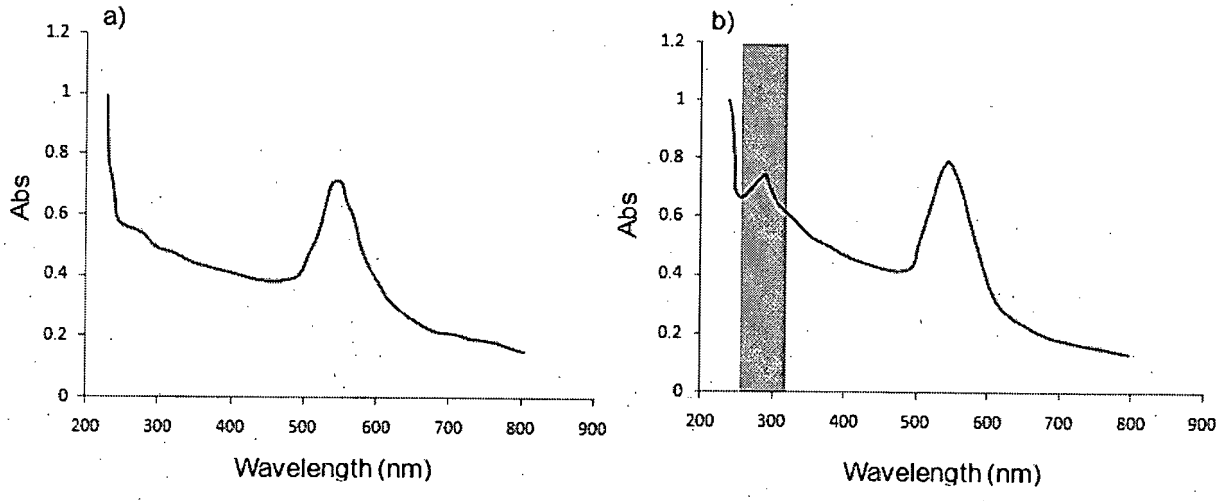

a)
Abs
Wavelength (nm)
b)
Abs
Wavelength (nm)

FIG. 6

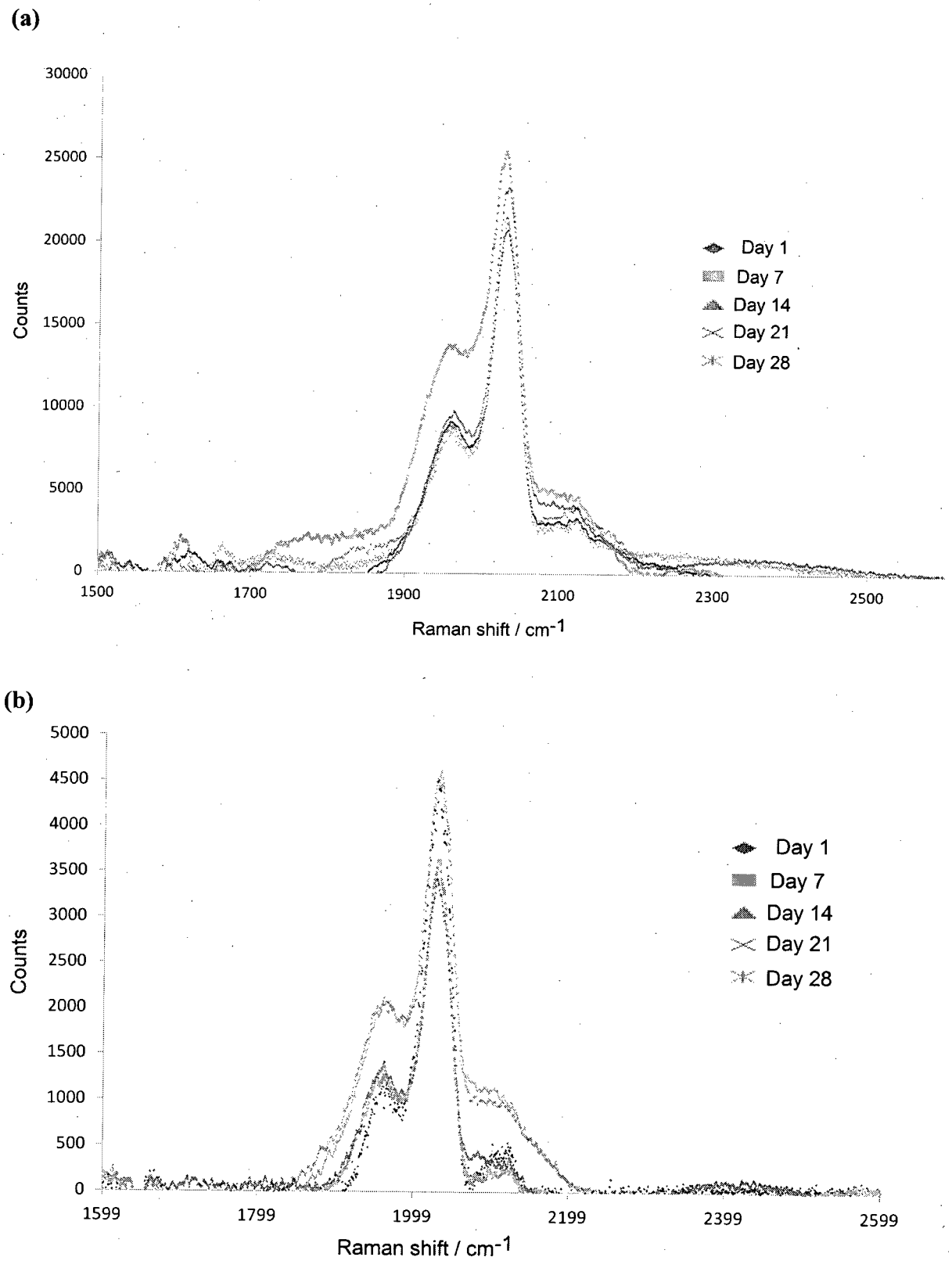

(a)
30000
25000
20000
15000
10000
5000
0
Counts
1500
1700
1900
2100
2300
2500
Raman shift / cm-1
Day 1
Day 7
Day 14
Day 21
Day 28
(b)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Counts
1599
1799
1999
2199
2399
2599
Raman shift / cm-1
Day 1
Day 7
Day 14
Day 21
Day 28

FIG. 7

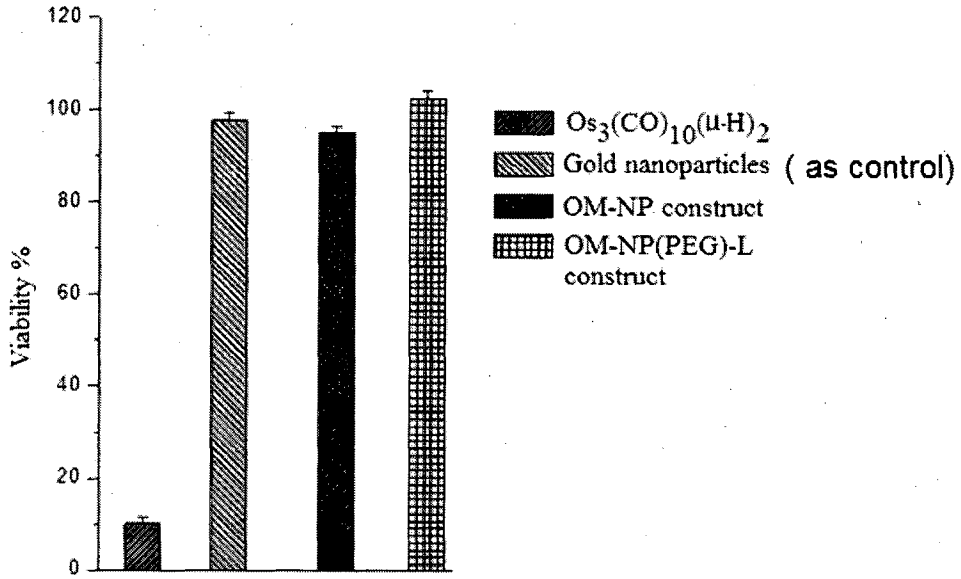

120
100
80
60
40
20
0
Viability %
$Os_3(CO)_{10}(\mu\text{-}H)_2$
Gold nanoparticles (as control)
OM-NP construct
OM-NP(PEG)-L construct

FIG. 8

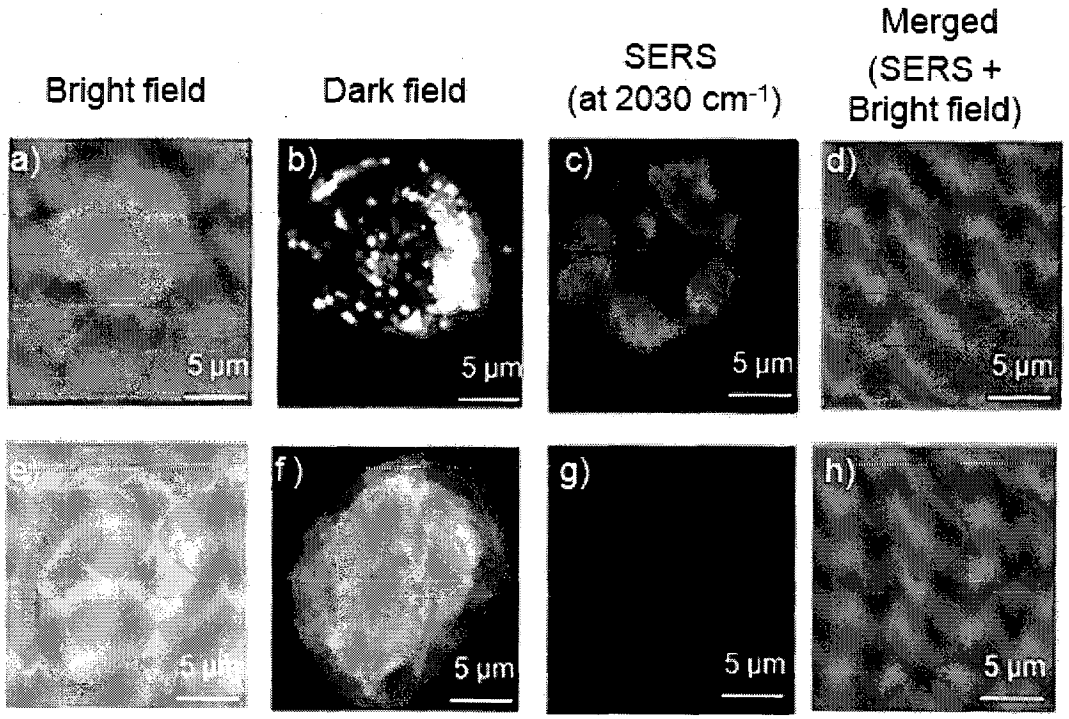

Bright field
Dark field
SERS (at 2030 cm^{-1})
Merged (SERS + Bright field)
a)
b)
c)
d)
e)
f)
g)
h)
5 µm

FIG. 9

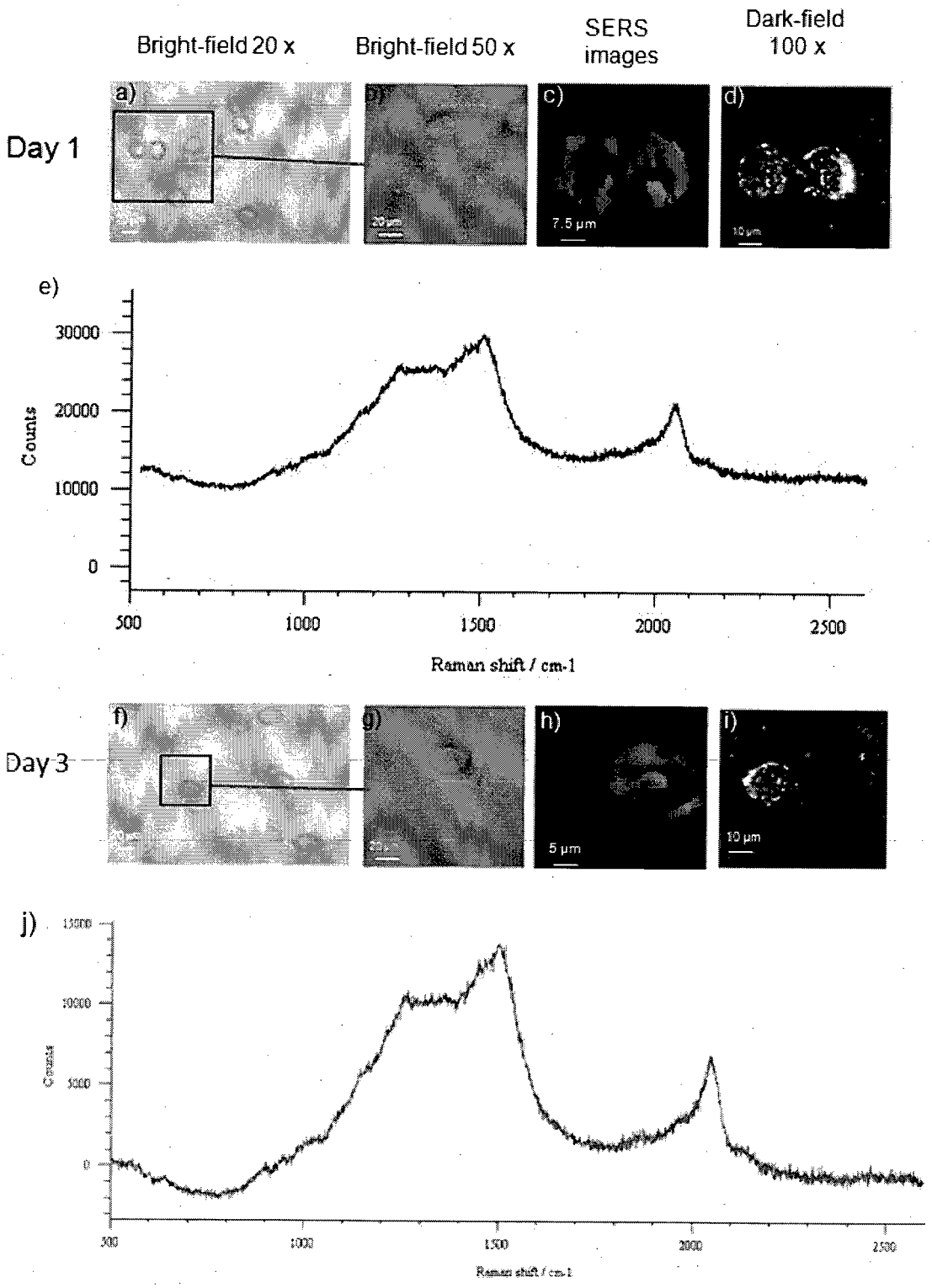

Bright-field 20 x
Bright-field 50 x
SERS images
Dark-field 100 x
Day 1
a)
b)
c)
d)
7.5 µm
10 µm
e)
30000
20000
10000
0
Counts
500
1000
1500
2000
2500
Raman shift / cm-1
Day 3
f)
g)
h)
i)
5 µm
10 µm
j)
Counts
Raman shift / cm-1

FIG. 10

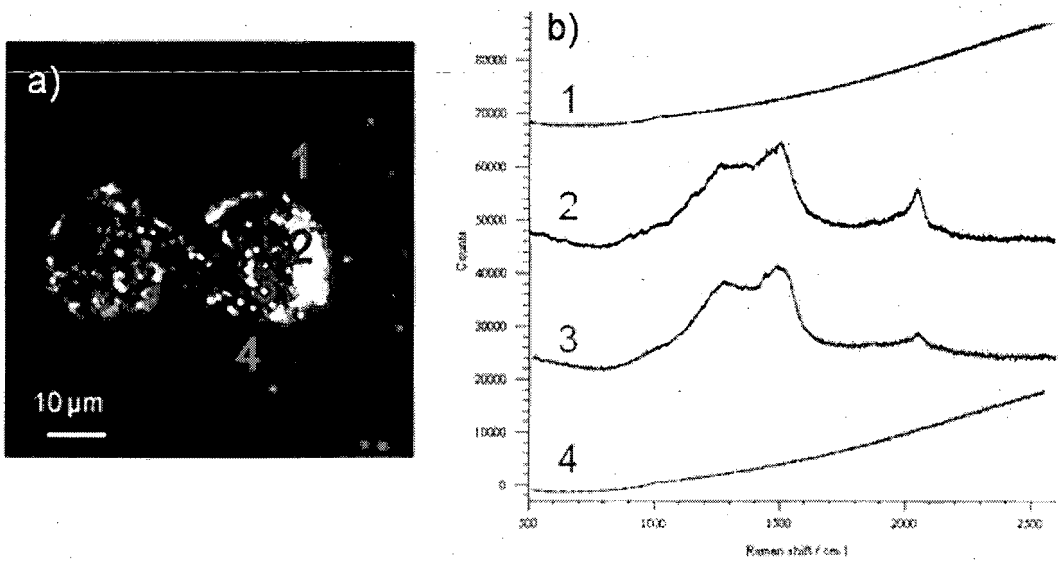

a)
1
2
4
10 µm
b)
1
2
3
4
Counts
Raman shift / cm-1

FIG. 11

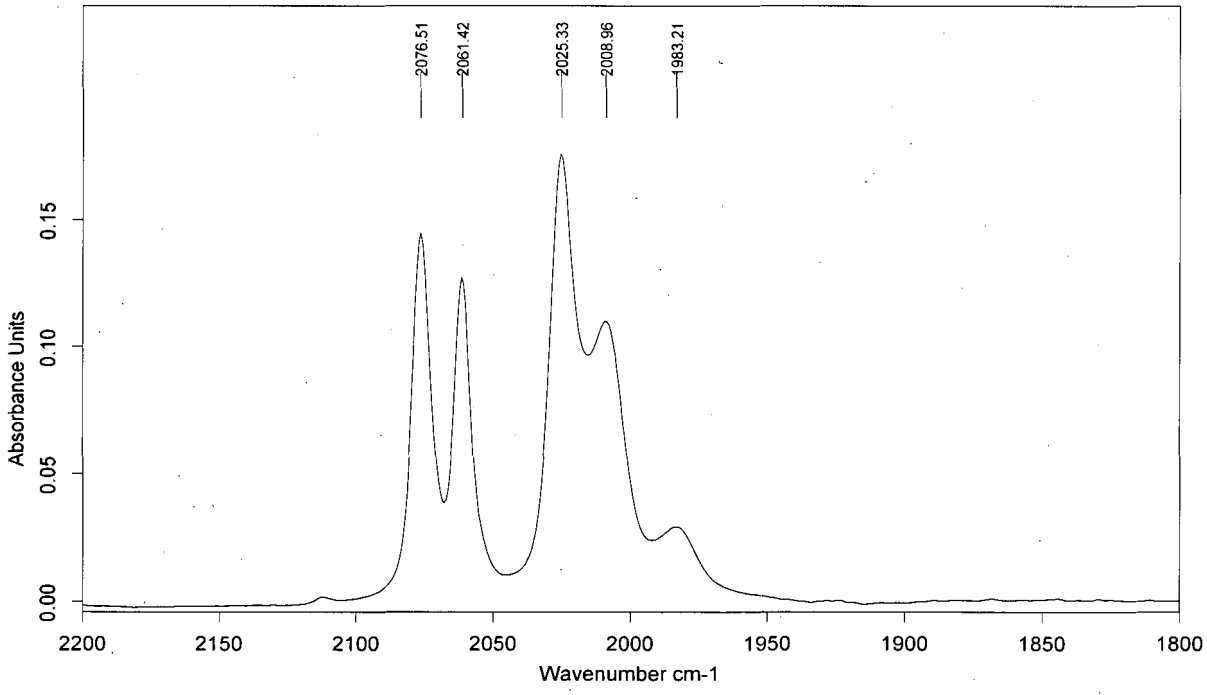

2076.51
2061.42
2025.33
2008.96
1983.21
Absorbance Units
0.00
0.05
0.10
0.15
2200
2150
2100
2050
2000
1950
1900
1850
1800
Wavenumber cm-1

FIG. 12

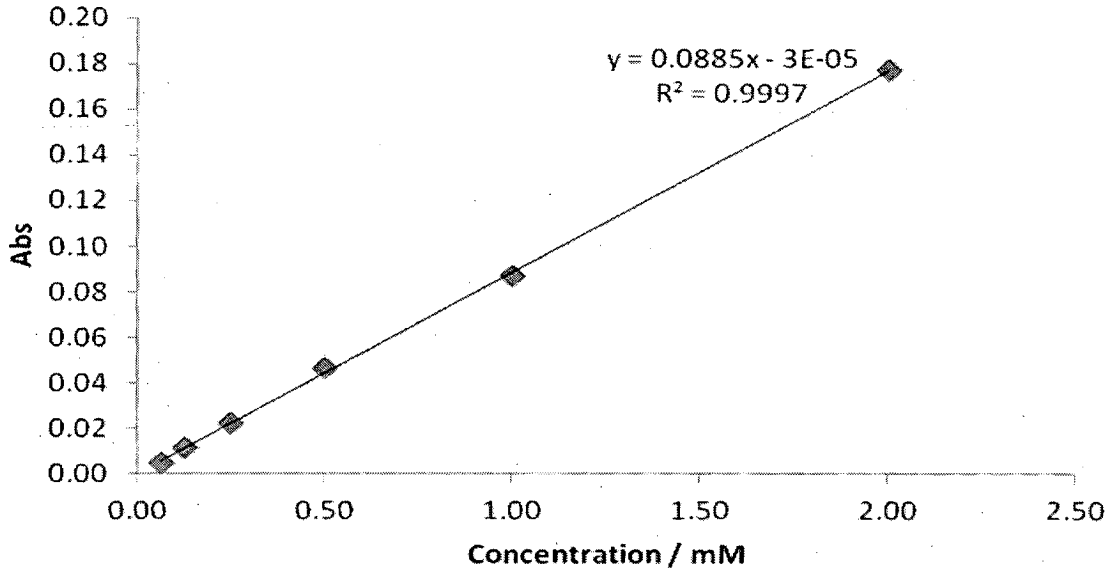


FIG. 13

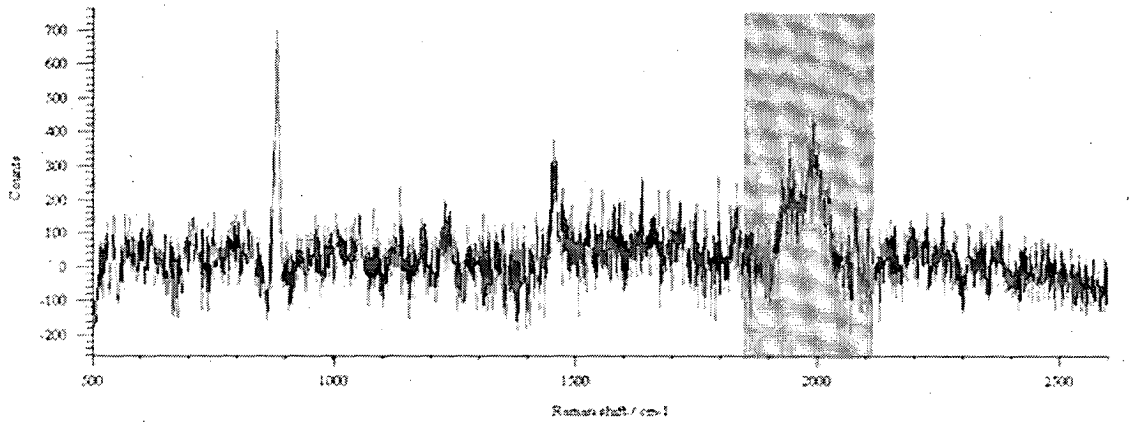


FIG. 14

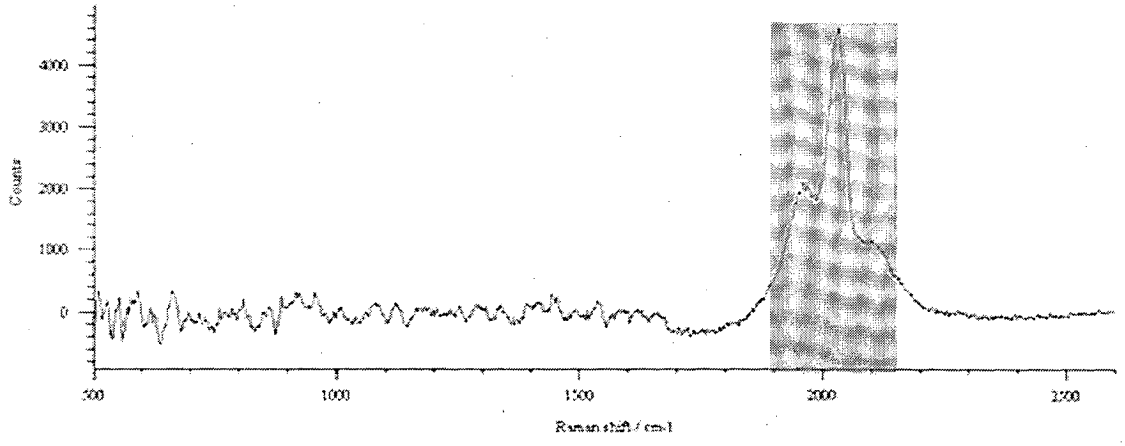
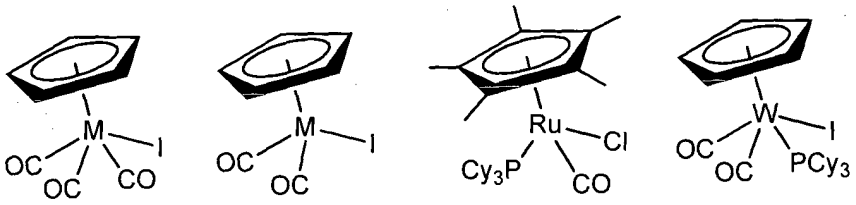


FIG. 15



1a: M = Mo
1b: M = W

2a: M = Ru
2b: M = Os

3

4

FIG. 16

