Supporting Information

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Catalytic Reduction of Hexavalent Chromium using Nanostructured Polyamic Acid

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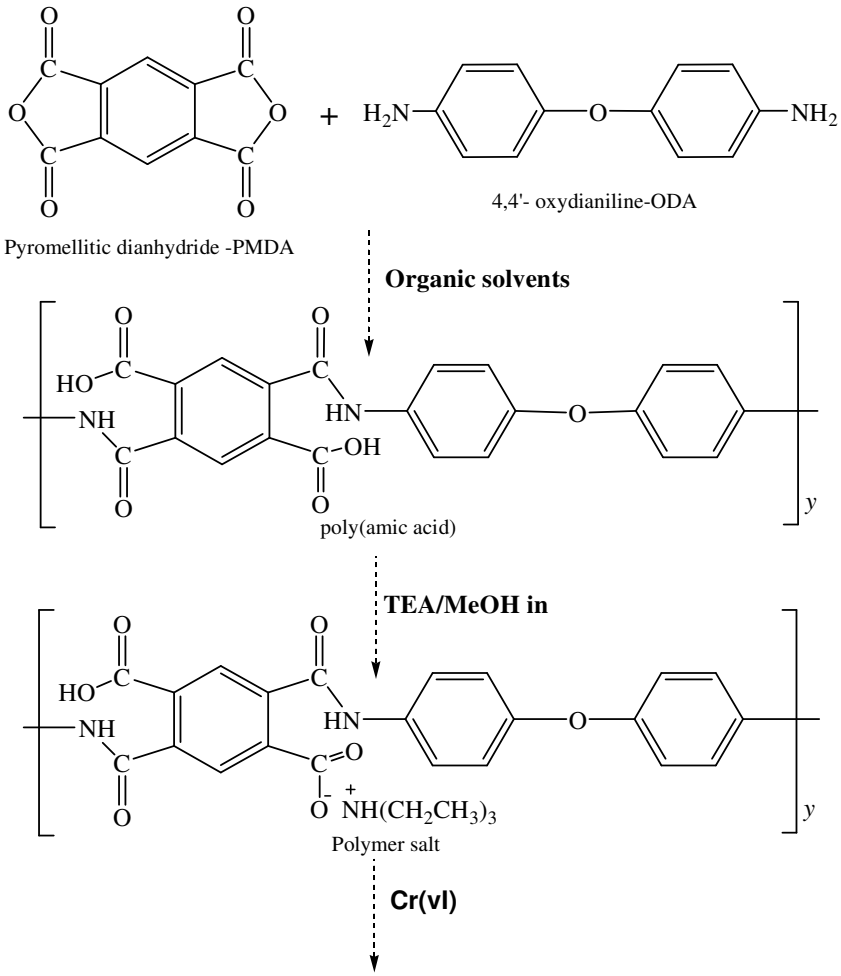
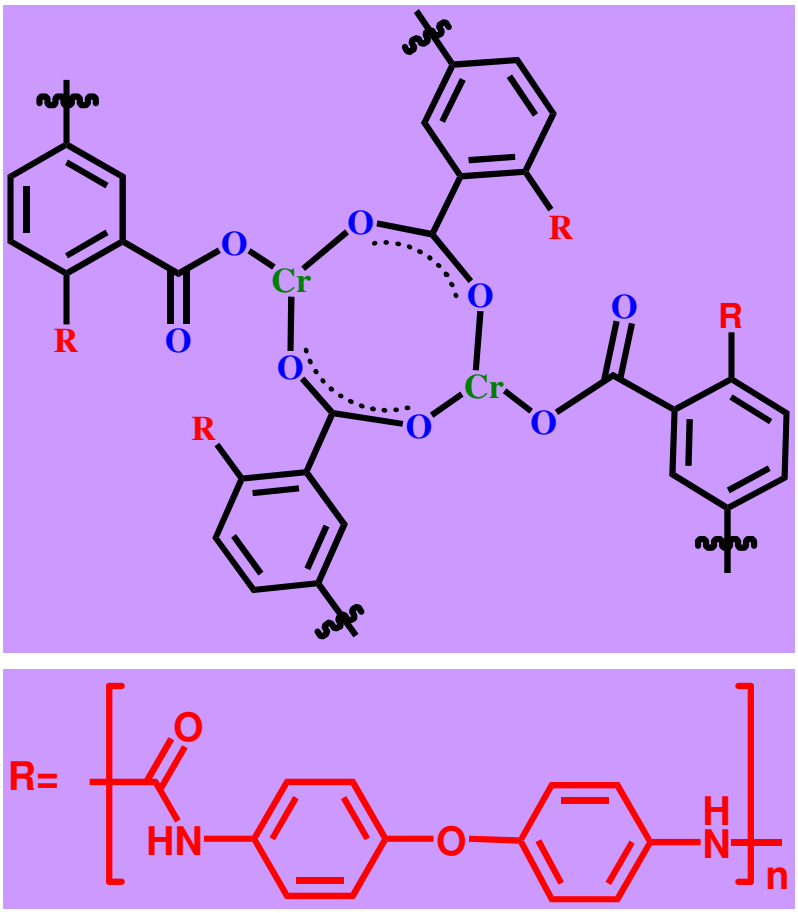
Introduction. The purpose of this section is to provide additional information of interest to the readers. These include the schematics of reduction of Cr(VI) ions by poly(amic acid) and formation of PAA-Cr(III) complex; figures showing TEM images of PdNPs; stability of PAA modified Au- electrode; XRD patterns for PAA, XPS of PdNPs; the residual Cr(VI) plot against exposure time; the reduction efficiency of Cr(VI) in solution at different initial concentrations (10-10^7 μM) using 1.5 mg of PAA powder within 15 minutes of exposure.


Pyromellitic dianhydride -PMDA
4,4'- oxydianiline-ODA
Organic solvents
poly(amic acid)
TEA/MeOH in
Polymer salt
Cr(vl)



Scheme 1. Reduction of Cr(VI) ions by poly(amic acid) and formation of PAA-Cr(III) complex.

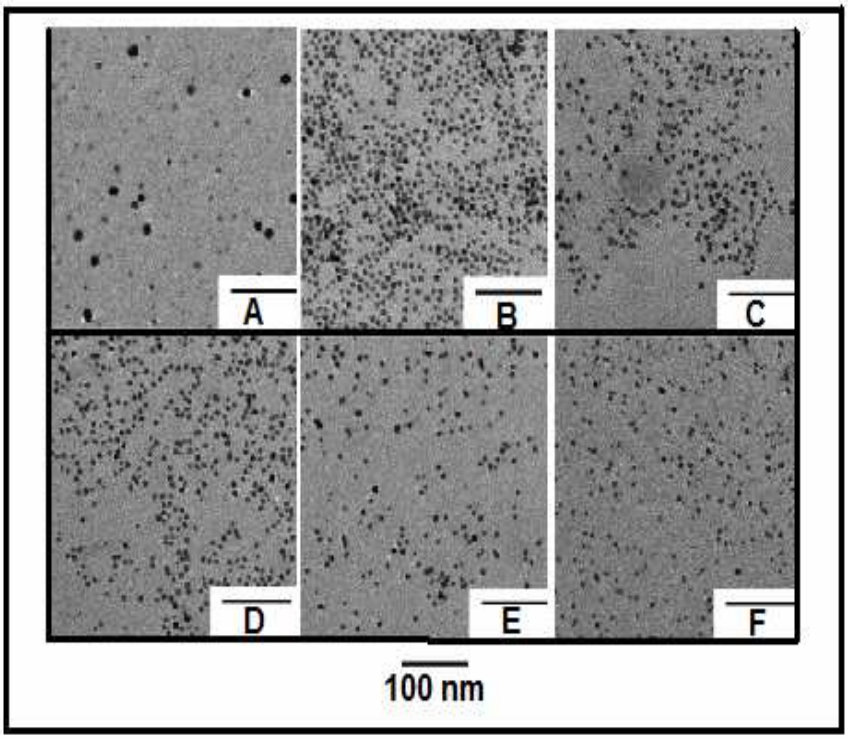
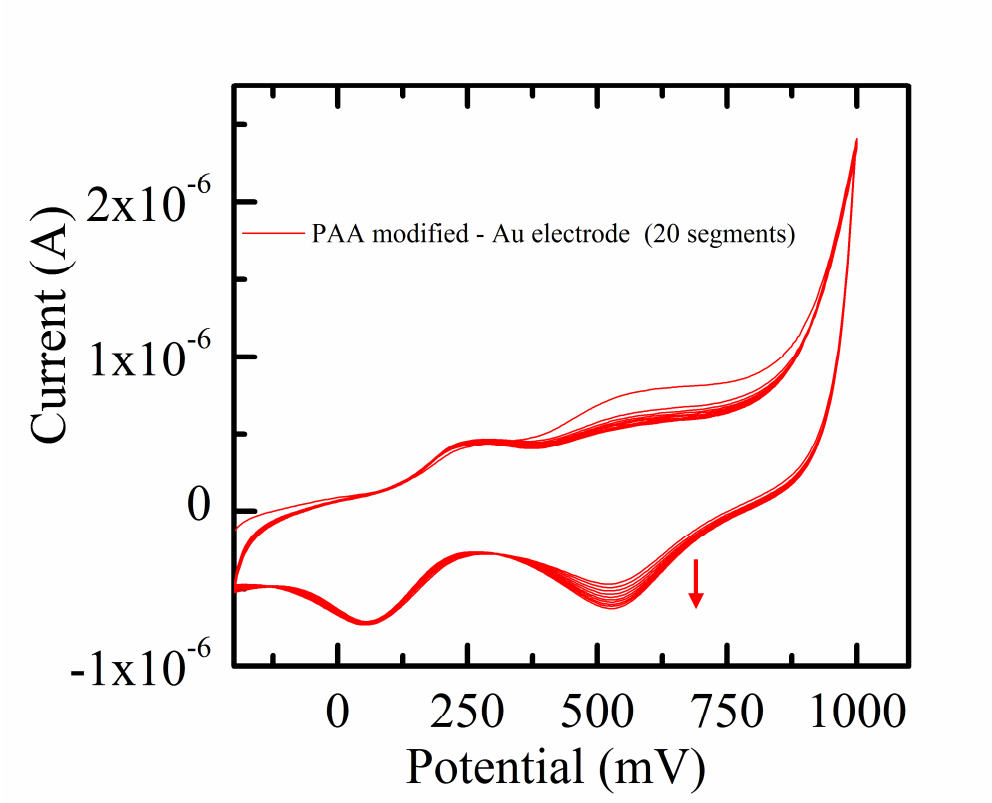


Figure 1.[A] Transmission electron micrograph images of PdNPs: (A) 3 mg/ml of palladium acetate in DMF mixed with 5mg/ml of sodium borohydride in water (B) 6mg/lm of palladium acetate in DMF mixed with 20mg/ml of sodium borohydride in water. (C) 6mg/lm of palladium acetate in DMF mixed with 10mg/ml of sodium borohydride in water (D) the amounts of PAA: PdNPs in mg/ml was 1:1 (E) the ratio of PAA: PdNPs was 3:1 (F) the ratio of PAA: PdNPs was 5:1



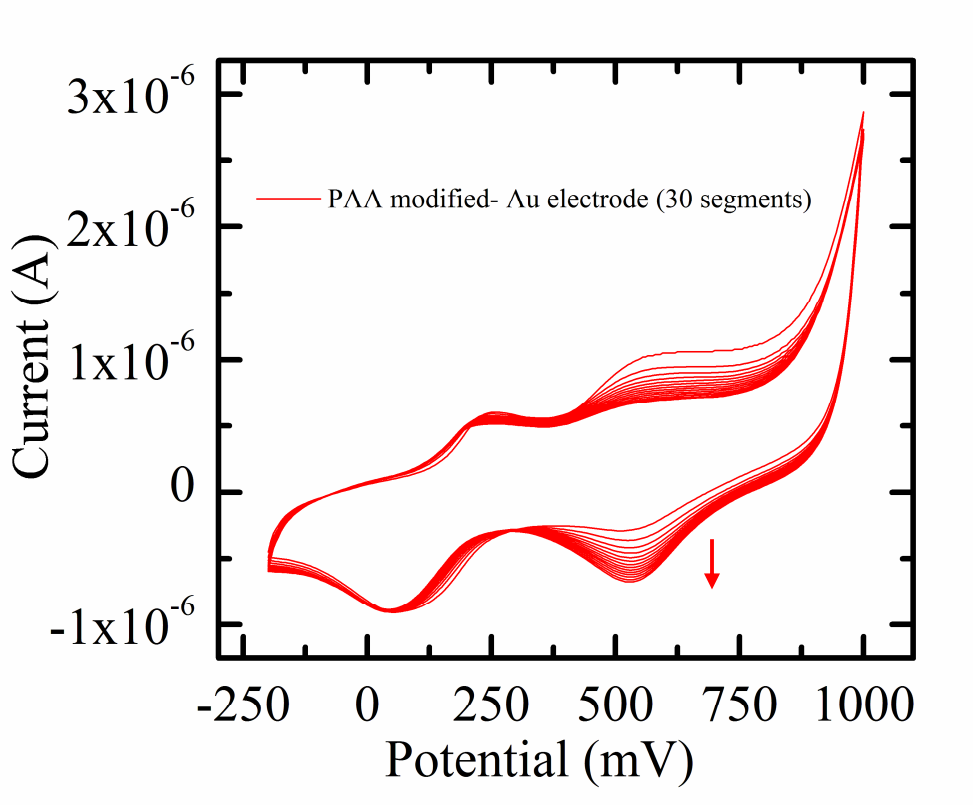


Figure 2. Electrochemical stability of PAA modified-Au electrode (scan rate 50mV/s, Ag/AgCl reference electrode)

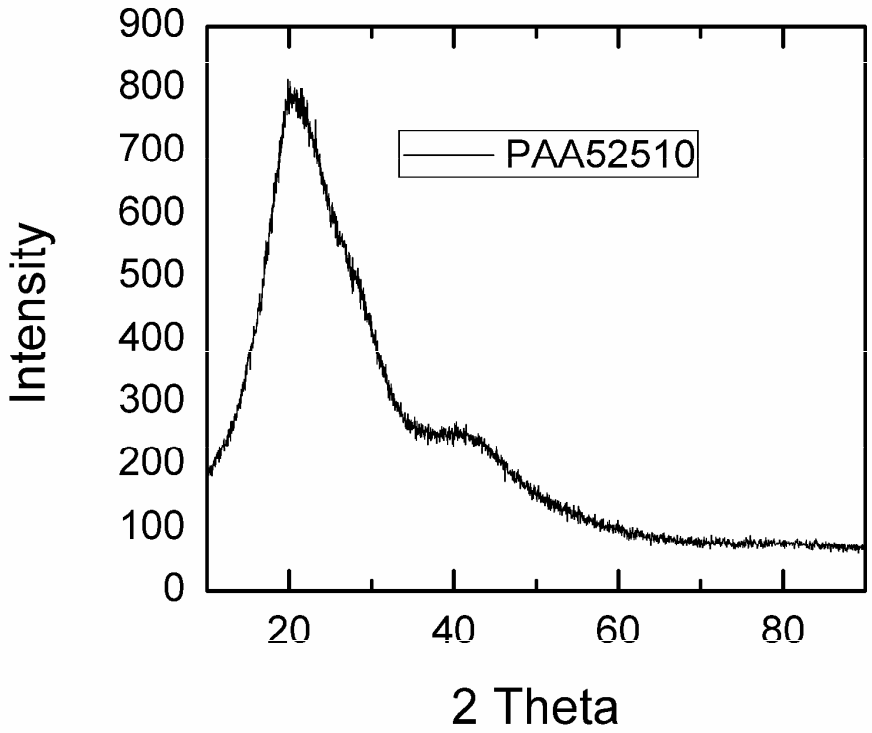
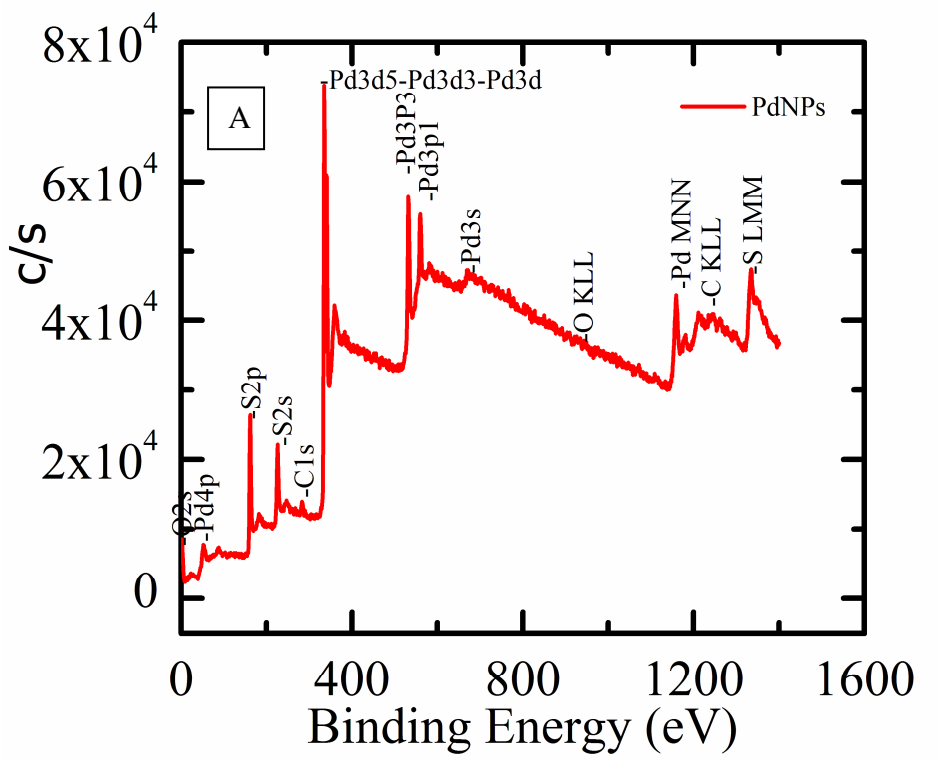
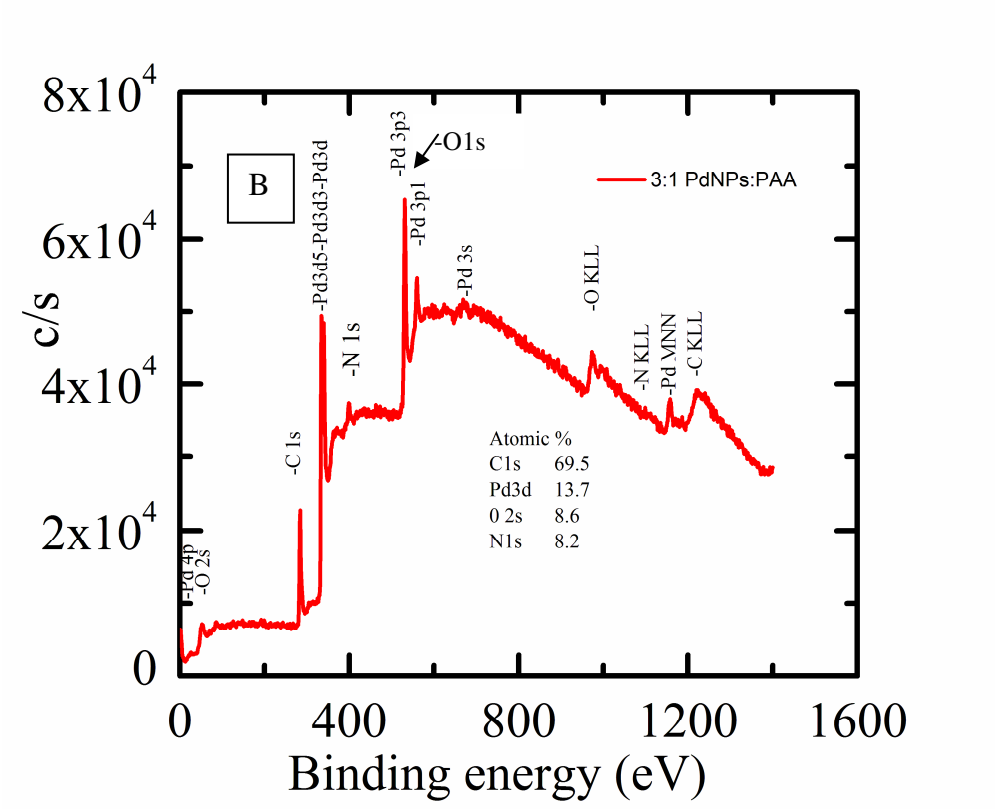


Figure 3. XRD pattern of polyamic acid


A
PdNPs
-Pd3d5-Pd3d3-Pd3d
-Pd3P3
-Pd3p1
-Pd3s
-O KLL
-Pd MNN
-C KLL
-S LMM
-S2p
-S2s
-C1s
-Pd4p
c/s
Binding Energy (eV)


B
3:1 PdNPs:PAA
-Pd3d5-Pd3d3-Pd3d
-Pd 3p3
-O1s
-Pd 3p1
-Pd 3s
-O KLL
-N 1s
-C 1s
-N KLL
-Pd MNN
-C KLL
-Pd 4p
-O 2s
Atomic %
C1s 69.5
Pd3d 13.7
0 2s 8.6
N1s 8.2
c/s
Binding energy (eV)

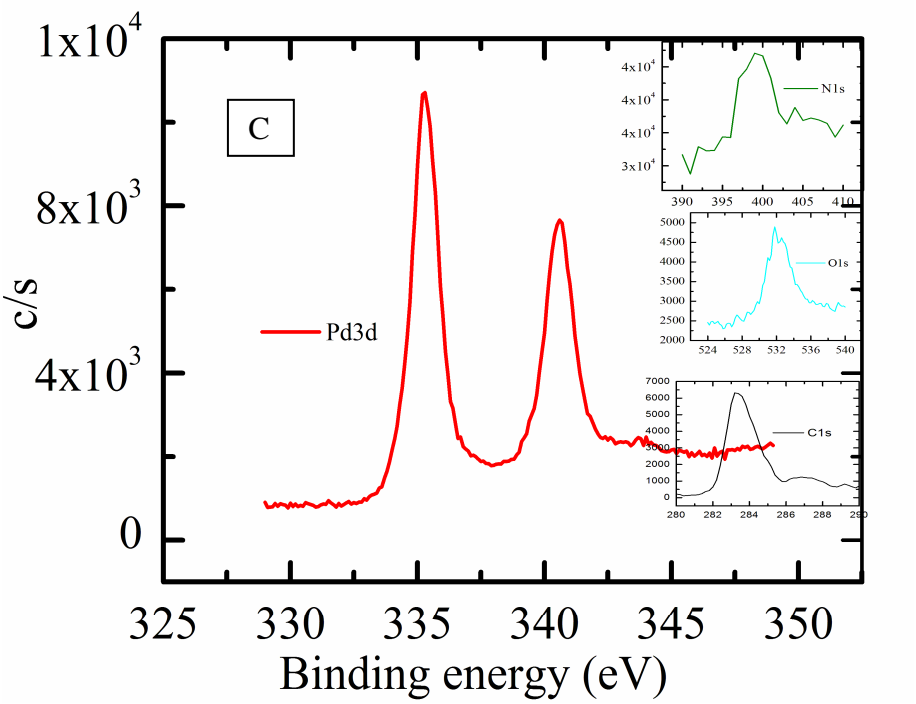


Figure 4. XPS data referenced with adventitious carbon at 284.8 eV. Al mono 99.8 W 100.0µ 45.0°take off angle and pass energy of 187.85 eV. [A]PdNPs [B] 3 mg PdNPs dispersed in 1 mg PAA.[C] High resolution XPS spectra of Pd3d, inset: N1s, O1s & C1s.

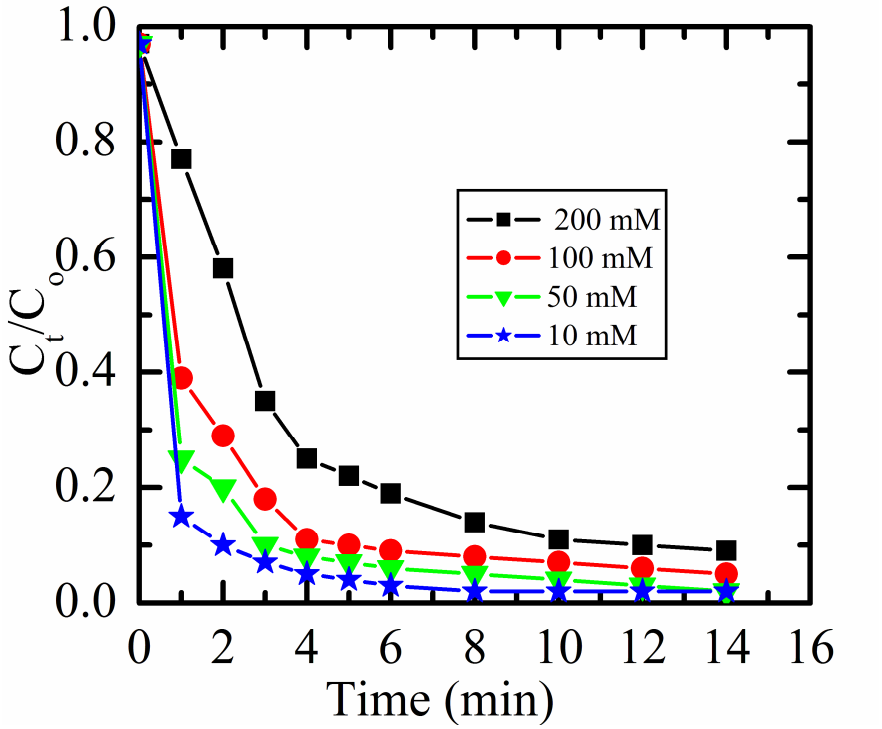


Figure 5. The Cr(VI) solutions with different initial concentrations, in the range of 10–200 mM, exposed to the same amount (1.5 mg) of PAA for 16 min. residual Cr(VI) plot against time of exposure

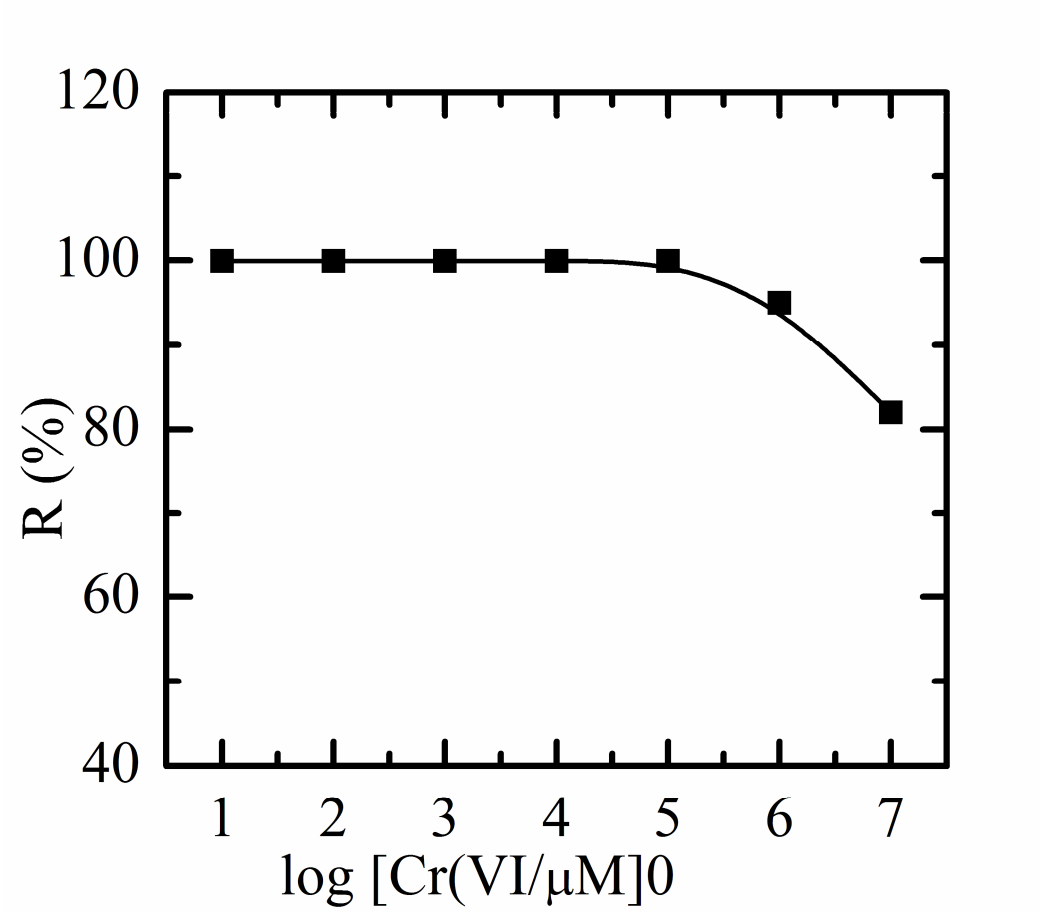


Figure 6. The reduction efficiency of Cr(VI) in solution, with different initial concentrations (10-10^7 μM) using 1.5 mg of PAA powder within 15 minutes of exposure.