

Supplementary Material

Immobilization of palladium nanostructures in polyethersulfone beads: recyclable catalyst for chromium(VI) remediation

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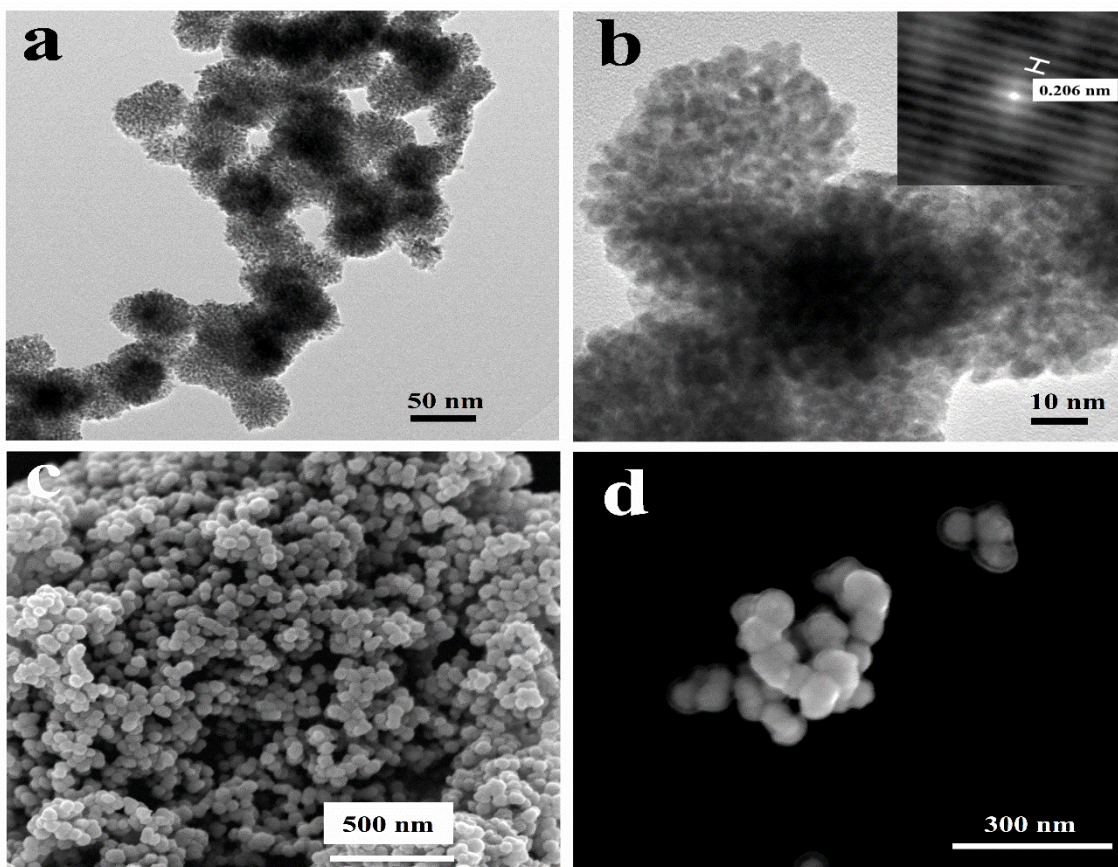


Figure S1. TEM (a, b) and SEM (c, d) images of Pd nanostructure used in synthesis of Pd-PES.

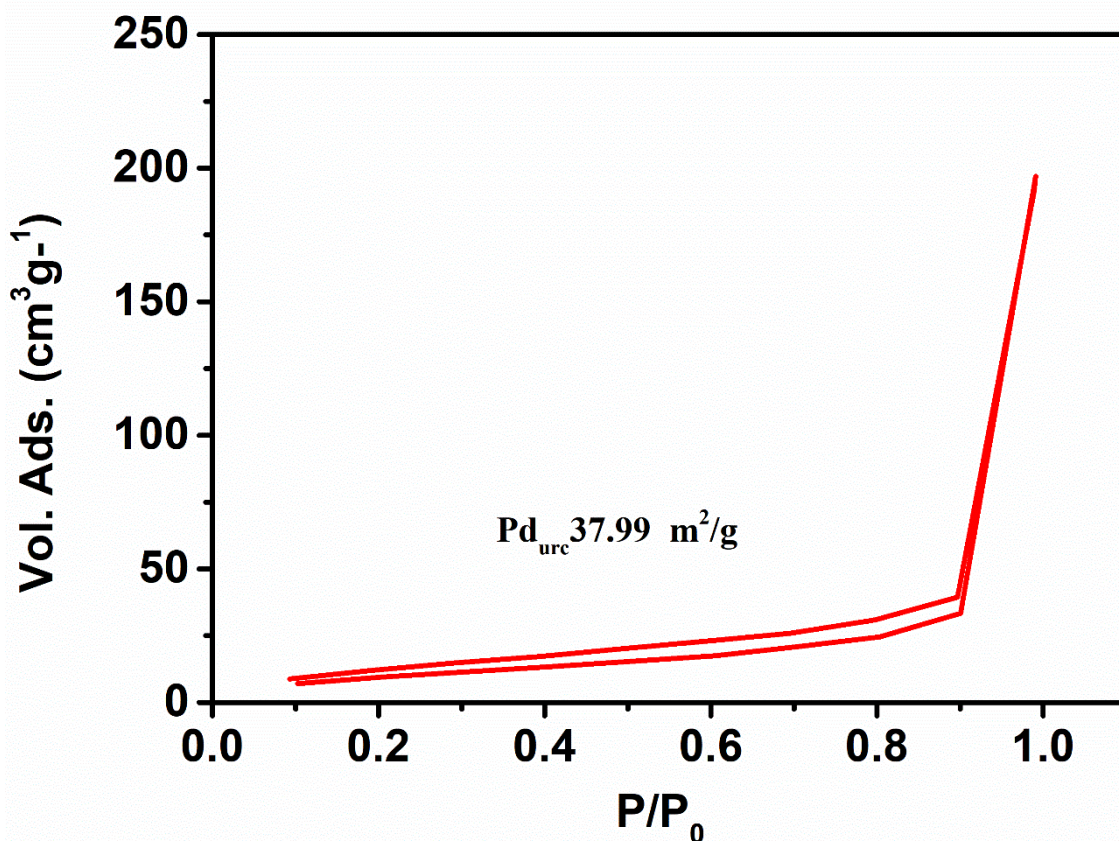


Figure S2. Nitrogen adsorption–desorption isotherms at 77 K for Pd_{urec} Nanostructures.

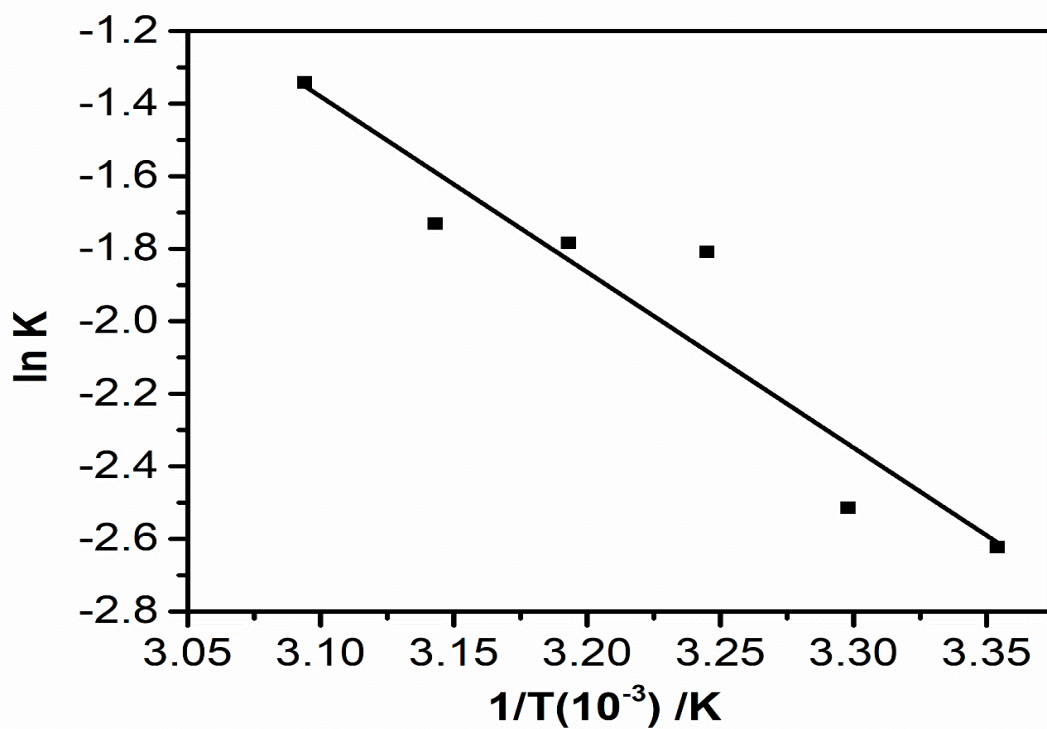


Figure S3. Arrhenius plot of $\ln(k_{app})$ versus $1/T(10^{-3})$ for the evaluation of the activation energy.

AAS analysis of Pd-PES beads

To determine the amount of Pd trapped inside of PES bead matrix AAS analysis is done. From AAS analysis leaching of Pd from Pd-PES beads is also estimated. 15 number of unused beads and 15 number of 100 times reused beads are taken in two beakers. The beads are kept under infra-red lamp for 30 minutes to ensure they are completely dry. Beads are weighed and taken into 10 ml glass beaker. Into it is added 1.5 ml concentrated Nitric acid and heated at 80°C for about 10 minutes (acid digestion). In this digestion process Pd (0) present into PES matrix get oxidized and come into the solution in the water-soluble form Pd²⁺. PES matrix is collapsed but remains insoluble. The solution is diluted in 25 ml volumetric flask up to the mark by nanopore water and is subjected to AAS analysis. To minimize error, experiment is done in duplicate.

Tetraaminepalladium (II) chloride is used as a standard Pd source. From this standard solution, a calibration curve is plotted which gives a slope of 0.03016

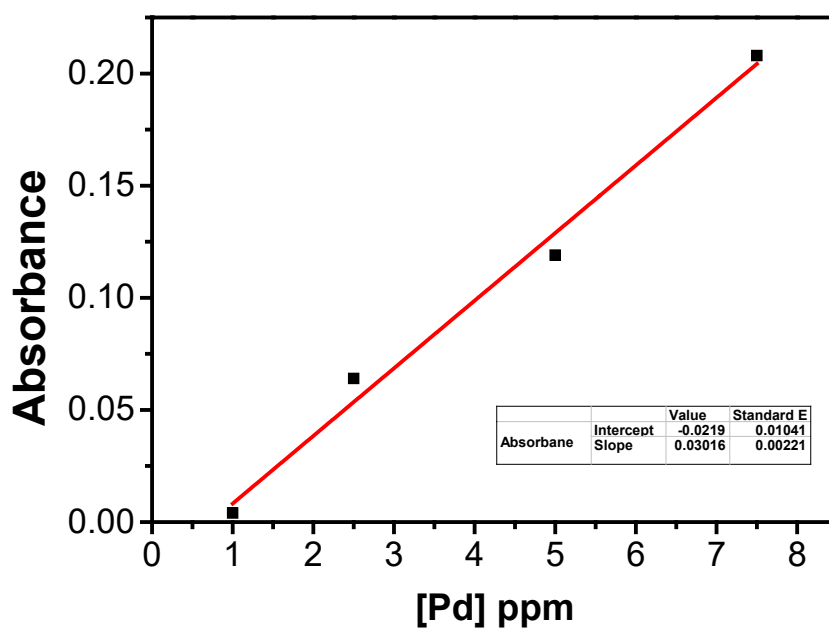


Figure S4. Calibration curve of Pd

By using lineare equation, concentration of the unknown sample is calculated and is presented in below table.

Table S1. AAS analysis of Pd-PES beads

No.	Sample Code	No of Pd-PES beads	Weight of dried beads (mg)	Abs in AAS	[Pd] in Beads (ppm)	[Pd] / mg of Pd-PES (µg)	% loading of Pd
1	USED-1	15	17.25	0.092	3.0503	4.4209	0.44
2	USED-2	15	17.73	0.086	2.8514	4.0207	0.40
4	UN-USED-1	15	17.78	0.089	2.9509	4.1492	0.41
5	UN-USED-2	15	17.92	0.082	2.7188	3.7930	0.38