

A Conveniently Synthesized Polyethylene Gel Encapsulating Palladium Nanoparticles as a Reusable High-Performance Catalyst for Heck and Suzuki Coupling Reactions

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Tables and Figures

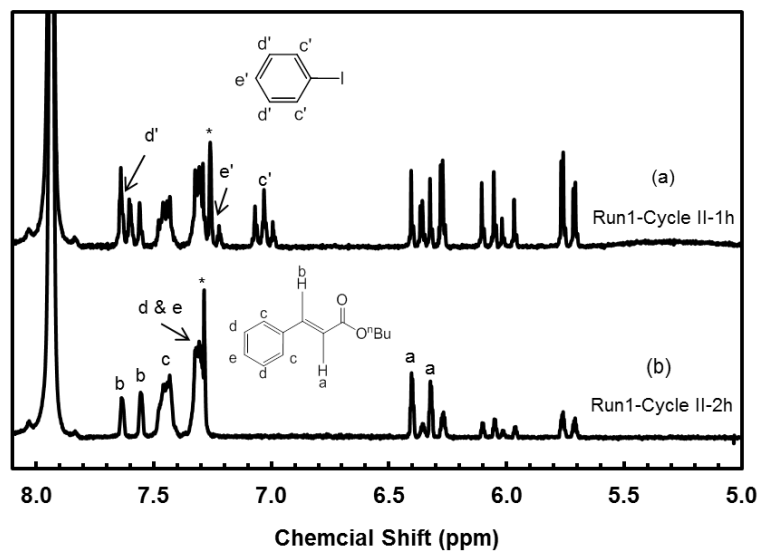


Figure S1. ¹H NMR (200 MHz) spectra of (a) Run1-Cycle II-1h and (b) Run1-Cycle II-1h in CDCl₃. The signals marked with an asterisk (*) result from the CHCl₃ in the deuterated solvent.

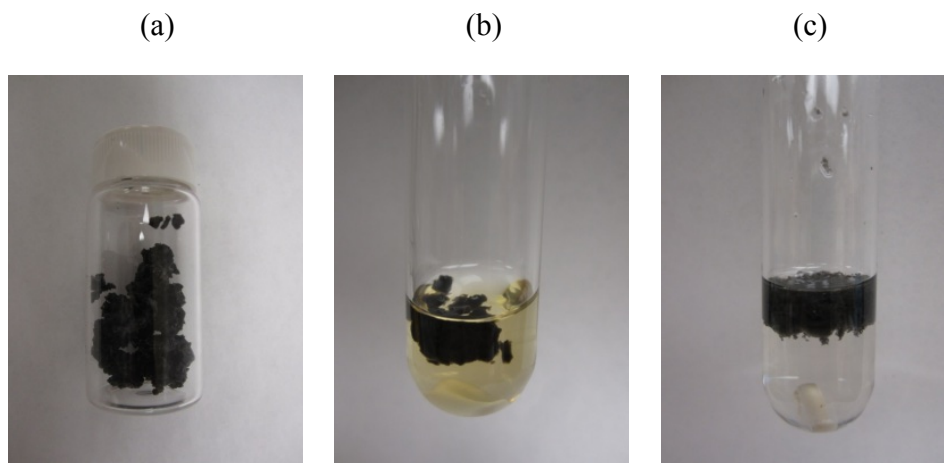


Figure S2. Appearances of (a) PE gel product, (b) PE gel in reaction system of Cycle I, and (c) PE gel of Cycle IV in Heck reaction of iodobenzene (IB) and n-butyl acrylate (nBA).

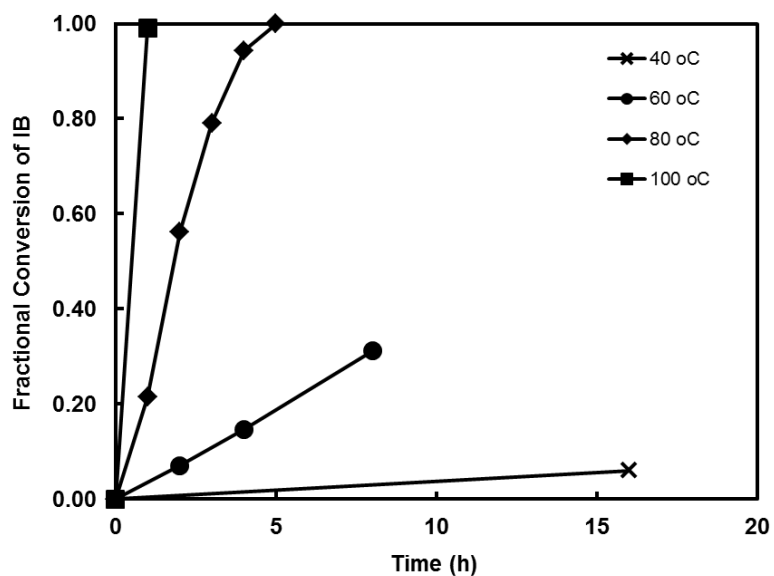


Figure S3. Heck reaction of IB and nBA with the PE gel **2** as catalyst at 40, 60, 80, and 100 °C. $[Pd]_0/[IB]_0 = 0.15\%$, 0.5 g of IB in 3 mL of DMF, $[IB]_0:[nBA]_0:[NEt_3]_0 = 1:1.5:1.5$.

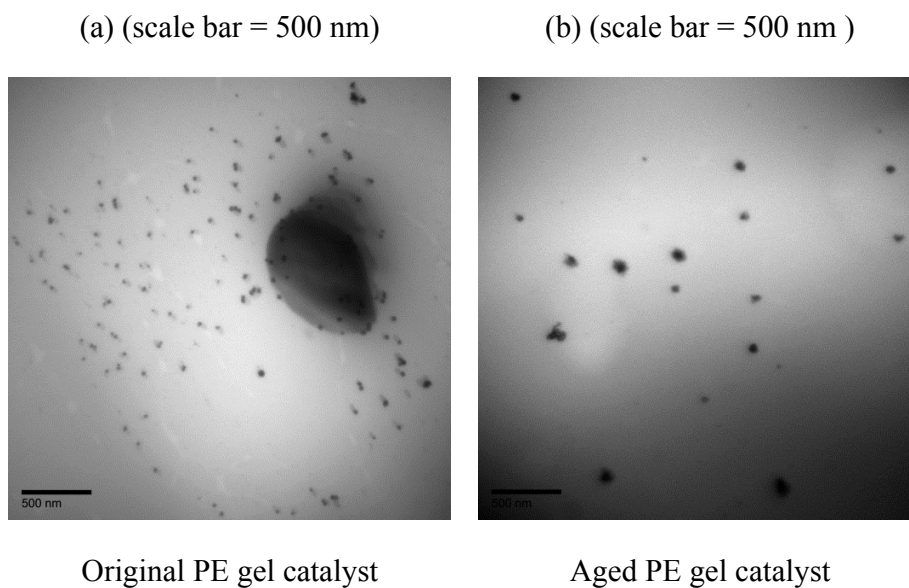


Figure S4. TEM micrographs (a magnification of 50 K times, scale bar = 500 nm) of (a) original PE gel encapsulating Pd nanoparticles and (b) aged PE gel catalyst after a three-cycle recycling at 100 °C with 24 h for each cycle.

Reference:

- [1] Johnson LK, Killian CM, Brookhart M. New Pd(II)- and Ni(II)-Based Catalysts for Polymerization of Ethylene and α -Olefins. *Journal of the American Chemical Society*. 1995;117:6414-5.
- [2] Ye JD, Ye ZB, Zhu SP. Synthesis and characterization of hyperbranched polyethylenes containing cross-linking structures by chain walking copolymerization of ethylene with diacrylate comonomer. *Polymer*. 2008;49:3382-92.