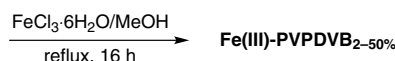
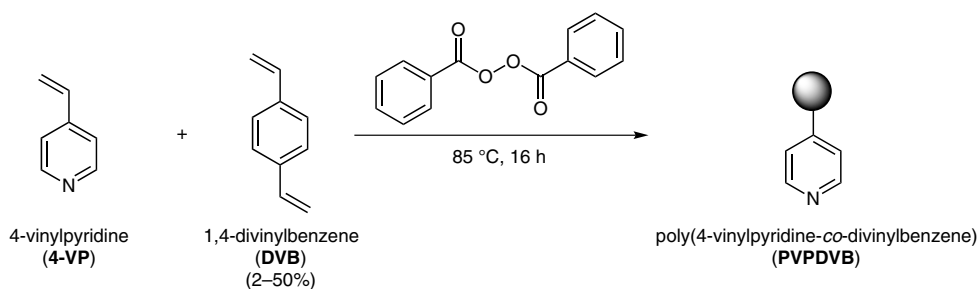


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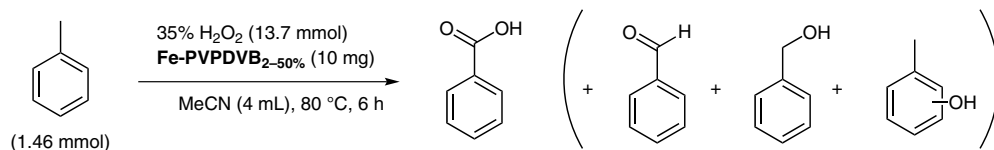
Poly(4-vinylpyridine-co-divinylbenzene) Supported Iron(III) Catalyst for Selective Oxidation of Toluene to Benzoic Acid with H_2O_2

Tetrahedron **2012**, *68*, 9423–9428.

Polymer-Supported Iron(III) Catalyst for the Selective Oxidation of Toluene



Fe(III)-PVPDVB_{2%} 75% yield, 0.55 mmol/g Fe
 Fe(III)-PVPDVB_{6%} 75% yield, 0.54 mmol/g Fe
 Fe(III)-PVPDVB_{10%} 96% yield, 0.41 mmol/g Fe
 Fe(III)-PVPDVB_{25%} 73% yield, 0.52 mmol/g Fe
 Fe(III)-PVPDVB_{50%} 97% yield, 0.46 mmol/g Fe



Fe(III)-PVPDVB_{2%} 73.0% conv., 91.0% selectivity to benzoic acid
 Fe(III)-PVPDVB_{6%} 78.8% conv., 90.2% selectivity to benzoic acid
 Fe(III)-PVPDVB_{10%} 89.7% conv., 91.2% selectivity to benzoic acid
 Fe(III)-PVPDVB_{25%} 77.0% conv., 89.3% selectivity to benzoic acid
 Fe(III)-PVPDVB_{50%} 77.9% conv., 88.3% selectivity to benzoic acid

Significance: Poly(4-vinylpyridine-co-divinylbenzene)-supported iron(III) catalysts bearing different amounts (2–50%) of DVB cross-linker [Fe(III)-PVPDVB_{2–50%}] were prepared and applied to the oxidation of toluene with hydrogen peroxide (73.0–89.7% conversion, 88.3–91.2% selectivity to benzoic acid). The polymer-supported catalyst containing 10% DVB [Fe(III)-PVPDVB_{10%}] led to the selective oxidation of toluene to benzoic acid in 90% conversion with up to 96% selectivity under optimized conditions.

Comment: The catalytic activity of reused Fe(III)-PVPDVB_{10%} decreased due to leaching of iron ions from the polymer support. No oxidation of toluene occurred in the absence of the polymer-supported iron catalysts or in the presence of iron-free PVPDVB. The toluene oxidation with the homogeneous counterpart, $\text{FeCl}_3 \cdot \text{H}_2\text{O}$, resulted in lower substrate conversion (<58%), while the reaction selectivity was as high as with the polymeric catalyst (92%).

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