Title:	‘Pre-optimization’ of the solvent of nanoparticle synthesis for superior catalytic efficiency: a case study with Pd nanocrystals
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Abstract:	In view of a limited rationale available for designing metal nanocrystals (NCs) to achieve high catalytic activities across various chemical transformations, we offer a new perspective on the optimization of the ‘solvent-of-nanocrystal-synthesis’ that, to an extent, would help bypass the tedious characterization needs. A systematic improvement in a catalyst is hindered because (i) it relies on size & shape control protocols, surface characterization, understanding molecular transformation mechanisms, and the energetics of the reactant–catalyst interactions, requiring the involvement of different domains experts, and (ii) the insights developed using model reactions may not easily extend to other reactions, although the current studies count on such a hypothesis. In support of (ii), by taking Pd NCs as catalysts and two distinct reaction types, viz. Suzuki coupling and nitroarene reduction, we show to what great extent the reaction rates may vary even for the seemingly similar reactions by using the same NCs. More importantly, for challenge (i), we demonstrate how the addition of a single-step to the current protocol of ‘catalyst-synthesis and activity test’ can potentially lead to the development of highly active catalysts by first finding a suitable solvent for the NC synthesis, while such solvent-effects are barely considered unlike the same in organic transformation reactions as a matter of routine, for example.
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