# Electronic Supplementary Information

## Catalysis by metallic nanoparticles in aqueous solution: Model reactions

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**Table. S1.** Catalytic activity of the metal nanoparticles for the reduction reaction of 4-nitrophenol.

| Sample | Carrier system | Metal | $D^{1)}$, (nm) | Temp, [°C] | $k_1^{2)}$, ($s^{-1}m^{-2}L$) |
|---|---|---|---|---|---|
| Mei 2007 [1] | Cationic SPB | Pd | 2.4 ± 0.5 | 15 | 1.1 |
| | PS-PNIPAM core-shell microgel | Pd | 3.8 ± 0.6 | 15 | 0.11 |
| Mei 2005 [2] | Cationic SPB | Pt | 2.1 ± 0.4 | 15 | 0.56 |
| Schrinner 2007 [3] | Cationic SPB | Au | 1.3 ± 0.25 | 20 | 0.51 |
| Lu 2007 [4] | Anionic SPB | Ag | 3 ± 1.2 | 20 | $7.81\times10^{-2}$ |
| Lu 2005 [5] | PS-PNIPAM core-shell microgel | Ag | 8.5 ± 1.5 | 20 | $5.2\times10^{-2}$ |
| Lu 2006 [6] | Highly branched polymer brush | Ag | 7.5 ± 2 | 20 | $7.27\times10^{-2}$ |
| Lu 2010 [7] | PS-PNIPAM core-shell microgel | Au nanorods | width: 6.6 ± 0.3; length: 34.5 ± 5.2 | 20 | 0.14 |
| | | Au–Pt nanorods | width: 7.4 ± 0.8; length: 39.5 ± 6.5 | 20 | 0.21 |
| Esumi 2004 [8] | PAMAM dendrimer | Pd | 1.8 ± 0.42 | 15 | $3.07\times10^{-3}$ |
| | PPI dendrimer | Pd | 2 ± 0.41 | 15 | $7.76\times10^{-1}$ |
| | PAMAM dendrimer | Pt | 1.5 ± 0.35 | 15 | $3.60\times10^{-3}$ |
| | PPI dendrimer | Pt | 1.5 ± 0.28 | 15 | $8.04\times10^{-2}$ |
| Liu 2006 [9] | β-D-Glucosidase | Au | 8.2 ± 2.3 | 25 | $4.10\times10^{-2}$ |
| Wang 2007 [10] | PNIPAM-P4VP micelles | Au | 3.3 ± 0.2 | 25 | $3.72\times10^{-3}$ |
| Zhang 2010 [11] | PNIPAAm | Ag | 2.81 ± 0.62<br>3.45 ± 0.65 | | 0.124<br>0.196 |
| Murugadoss 2008 [12] | acetanlide | Au | 5 ± 1.7 | RT | 0.6532 |
| Zhang 2007 [13] | PDMAEMA | Au | 4.2 ± 1.2 | | $5.03\times10^{-4}$ |
| Panigrahi 2007 [14] | Citrate ligand | Au | 20 | 15<br>25<br>45<br>60 | $1.13\times10^{-3}$<br>$1.75\times10^{-3}$<br>$3.83\times10^{-3}$<br>$6.50\times10^{-3}$ |
| Murugadoss 2008 [15] | chitosan | Ag | 3 | | $1.50\times10^{-1}$ |
| Harish 2009 [16] | PEDOT | Pd | 1 - 9 | 25 | $2.22\times10^{-2}$ |

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|---|---|---|---|---|---|
| Kuroda 2009 [17] | PMMA | Au | 6.9 ± 5.5 | 25 | 4.8-5.3 $\times 10^{-1}$ |
| Behrens 2009 [18] | Protein | Pd | 2.85 ± 0.5 | 22 | 0.048 |
| Zhang 2009 [19] | $TiO_2$ | Ag | 3 | 21 | 0.78 |
| Yuan 2010 [20] | Organo-silica hybrid nanowires | Pt | 3 ± 0.5 | 20 | 0.31 |
| Signori 2010 [21] | PEI-E11 polymer | Ag | 24.5 ± 4.1 | 25 | 0.57 |
| | PEI-E5 polymer | | 19.5 ± 9.2 | 25 | 0.0081 |
| Halder 2011 [22] | cluster | Pd | 4-5 | | $1.33\times10^{-4}$ |
| | | | | | $2.5\times10^{-4}$ |
| Wu 2011 [23] | Collagen fiber | Au | 5.2 ± 1.6 | 25 | $6.02\times10^{-3}$ |
| Bhandari 2011 [24] | Peptide | Pd | 2.6 ± 0.5 | 20 | $1.67\times10^{-2}$ |
| Wu 2011 [25] | $SiO_2$ nanorattle | Au | 2.8 ± 0.7 | 25 | $5.49\times10^{-3}$ |
| | | | 3.3 ± 0.6 | 25 | $4.78\times10^{-3}$ |
| | | | 4.5 ± 0.7 | 25 | $2.61\times10^{-3}$ |
| Han 2010 [26] | PANI nanofiber | Au | 2 | RT | $1.91\times10^{-5}$ |
| | | | 10 | RT | $2.04\times10^{-5}$ |
| Arora 2010 [27] | $Al_2O_3$ | Pd | 6 ± 0.5 | 25 | $1.36\times10^{-1}$ |
| Yuan 2011 [28] | Poly(ionic liquid) brushes | Au | 2.1 ± 0.2 | 20 | 0.41 |
| | | Pd | 2.5 ± 0.3 | 20 | 0.58 |

[1)] $D$: diameter of the metal nanoparticles;

[2)] $k_1$: rate constant normalized to the surface of the particles in the system (Eq.1).

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