



SYRACUSE UNIVERSITY

TECHNOLOGY TRANSFER AND INDUSTRIAL DEVELOPMENT

New Mesoporous Catalyst Optimizes Henry Reaction

New invention based on study of nanoscale structure-property relationships

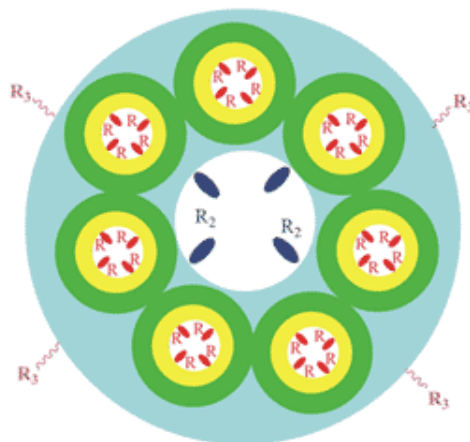
A new mesoporous catalyst has been created by the Asefa Lab at Syracuse University. It significantly improves the efficiency of the Henry reaction and is expected to have a similar effect on the Pinacol and Pinacolone reactions based in part on its low-cost materials and environmental benefits.

The catalyst is suited for applications in pharmaceuticals such as Aliskiren and in bulk materials for the cosmetic and eye care industries. The catalyst is the subject of a provisional patent application.

The cost of the new catalyst is relatively low because it is made from commercially available materials and the catalyst can be reused numerous times. The environmental impact of its use is also low. The residue from incinerated catalyst is sand.

The Asefa Lab focuses on design, synthesis and self-assembly of novel hybrid nanostructured and nanoporous materials and nanobiomaterials. Potential applications are in catalysts, nanoelectronics, separations and sensing. Consultation with the lab to draw on this know-how is an option for interested parties.

Papers co-authored by Professor Teddy Asefa have appeared in publications such as Nature, J. Am. Chem. Soc., and C&EN News among others.



SELECTED PUBLICATIONS

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2. Fuller, R.; Asefa, T.*; Schiff, E. A.* "Solvent-Washable Polymer Templated Synthesis of Mesoporous Silica and Solid Acid Nanocatalysts in One-Pot" 2008, *J. Am. Chem. Soc.*, *Submitted*.
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4. Xie, Y.; Anan, A.; Sharma, K. K.; Wang, G.; Asefa, T.* "Efficient Nanostructured Catalysts for Aldol Condensation Reaction" 2008, *J. Catal.*, *Submitted*.
5. Wang, G.; Blair, E. A.; Otuonye, A.; Asefa, T.* "Multifunctional Mesoporous Materials for Controlled Chemical and Drug Release" 2008, *J. Solid State Chem.*, *Submitted*
6. Asefa, T.*; Wang, G.; Blair, E. A.; Otuonye, A., Denton, K. "Multifunctional Nanoporous Materials for Adsorption and Controlled Drug Release" *Adsorption*, 2009, *In Press*.
7. Sharma, K. K.; Buckley, R. P.; Asefa, T.* "Optimizing Cooperative Acid-Base Bifunctional Mesoporous Catalysts for the Henry Reaction: Effects of Separation Distance of Site-Isolated Groups on Cooperative Catalysis", *Langmuir*, 2008, *24*, 14306-14320.
8. Asefa, T.*; Shi, Y.-L. "Corrugated Nanospheres and Nanocages: Synthesis via Controlled Etching and Improving Chemical Delivery and Electrochemical and Biosensing Applications" *J. Mater. Chem.*, 2008, *18*, 5604-5614.
9. Anan, A.; Vathyam, R.; Asefa, T.* "Controlling the Henry Reaction Products: Nitroalcohol versus Nitrostyrene by Simple Change of Amino-Groups of Aminofunctionalized Mesoporous Catalysts" *Catal. Lett.*, 2008, *126*, 142-148.
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11. Tao, Z.; Morrow, M. P.; Sharma, K. K.; Duncan, C.; Anan, A.; Asefa, T.; Penefsky, H. S.; Goodisman, J.*; Kader, A.* "Mesoporous Silica Nanoparticles Inhibit Cellular Respiration" *Nano Lett.*, 2008, *8*, 1517-1526.
12. Anan, A.; Sharma, K. K.; Asefa, T.* "Selective Efficient Trifunctional Nanoporous Catalysts for Nitroaldol Condensation: Co-Placement of Site-Isolated Multiple Functional Groups on Mesoporous Materials" *J. Molecular Catal. A*, 2008, *288*, 1-13. (*An Editor's Choice Article*).
13. Sharma, K. K.; Anan, A.; Buckley, R. P.; Ouellette, W.; Asefa, T.* "Towards Efficient Nanoporous Catalysts: Controlling Site-Isolation and Concentration of Grafted Catalytic Sites on Nanoporous Materials with Solvents and Colorimetric Elucidation of their Site-Isolation" *J. Am. Chem. Soc.*, 2008, *130*, 218-228.
14. Di Pasqua, A. J.; Sharma, K. K.; Shi, Y.-L.; Toms, B. B.; Ouellette, W.; Dabrowiak, J. C.*; Asefa, T.* "Cytotoxicity of mesoporous silica nanomaterials" *J. Inorg. Biochem.*, 2008, *102*, 1416-1423.
15. Otuonye, A.; Asefa, T.* "Efficient and Selective Nanoscale Catalysts by Solvent-Assisted Site-Isolated Grafting (SASIG) of Multiple Functional Groups on Mesoporous Materials" *Chemtracts*, 2007, *20*, 85-93.
16. Sharma, K. K.; Asefa, T.* "Efficient bifunctional nanocatalysts by simple postgrafting of spatially-isolated catalytic groups on mesoporous materials" *Angew. Chem., Int. Ed.*, 2007, *46*, 2879-2882.
17. Shi, Y.-L.; Asefa, T.* "Tailored core-shell-shell nanostructures: Sandwiching gold nanoparticles between silica cores and tunable silica shells" *Langmuir*, 2007, *23*, 9455-9462. (*Among the Top Ten Most Accessed Articles in 2007*).