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Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

Novel Green Chemistry in the Phosphonate Assisted Catalytic Hydrogenation of Olefins

Raghuraman Kannan^a; Nagavarakishore Pillarsetty^a; Kandikere Ramaiah Prabhu^a; Kattesh V. Katti^a

^a University of Missouri-Columbia, Columbia, Missouri

Online publication date: 27 October 2010

To cite this Article Kannan, Raghuraman , Pillarsetty, Nagavarakishore , Prabhu, Kandikere Ramaiah and Katti, Kattesh V.(2002) 'Novel Green Chemistry in the Phosphonate Assisted Catalytic Hydrogenation of Olefins', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 177: 8, 1951

To link to this Article: DOI: 10.1080/10426500213380

URL: <http://dx.doi.org/10.1080/10426500213380>

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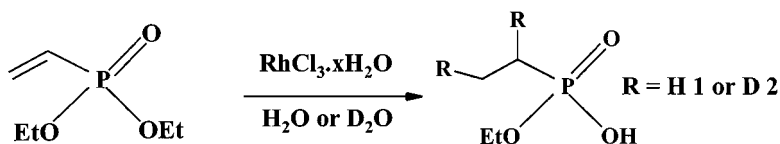
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NOVEL GREEN CHEMISTRY IN THE PHOSPHONATE ASSISTED CATALYTIC HYDROGENATION OF OLEFINS

*Raghuraman Kannan, Nagavarakishore Pillarsetty,
 Kandikere Ramaiah Prabhu, and Kattesh V. Katti
 University of Missouri-Columbia, Columbia, Missouri*

(Received July 29, 2001; accepted December 25, 2001)

A large number of catalytic hydrogenation reactions that utilize hydrogen gas or alcohol as hydrogen sources have found industrial applications. Far less known is the possibility of achieving reduction with the aid of water as the hydrogen donor in the presence of a catalyst. Our recent discovery allows the use of water as the source of hydrogen, in the presence of catalytic amounts of $\text{RhCl}_3 \cdot x\text{H}_2\text{O}$, to hydrogenate olefins bearing a phosphonate group. Deuterium labeling experiments using D_2O have provided conclusive evidence for this novel transfer of hydrogen from water to the olefin. The deuterium-incorporated product was characterized unambiguously by both high field NMR (^{13}C , ^1H , and ^2H) and mass spectrometric methods. The new chemistry and the vast scope offered by the phosphoryl assisted catalytic hydrogenation will be discussed.



SCHEME 1

Address correspondence to Kattesh V. Katti, Department of Radiology, Missouri University Research Reactor, University of Missouri-Columbia, Columbia, MO 65211.