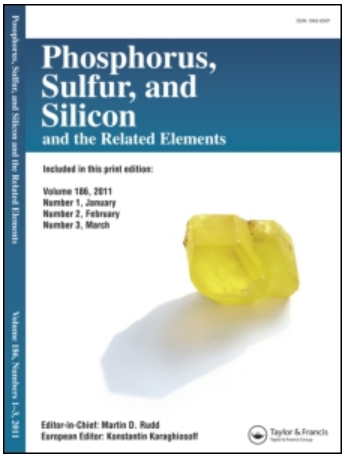

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Novel Green Chemistry in the Phosphonate Assisted Catalytic Hydrogenation of Olefins

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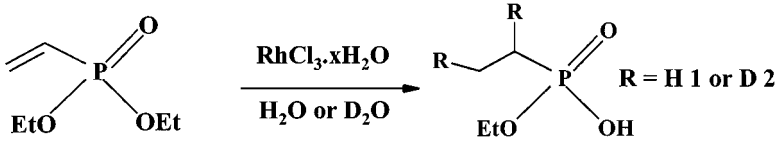
A large number of catalytic hydrogenation reactions that utilize hydrogen gas or alcohol as hydrogen sources have found industrial applications. Far less known is the possibility of achieving reduction with the aid of water as the hydrogen donor in the presence of a catalyst. Our recent discovery allows the use of water as the source of hydrogen, in the presence of catalytic amounts of $RhCl_3 \cdot xH_2O$, 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, ^{1}H, and ^{2}H) and mass spectrometric methods. The new chemistry and the vast scope offered by the phosphoryl assisted catalytic hydrogenation will be discussed.



SCHEME 1

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