Green Oxidation with Aqueous Hydrogen Peroxide

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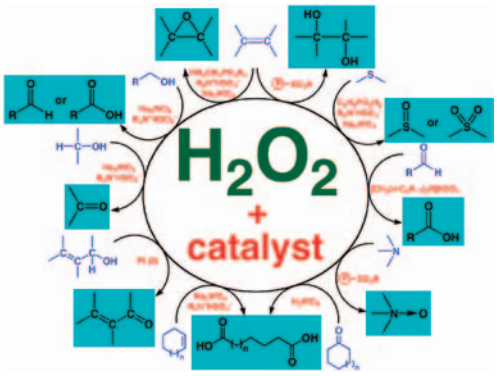
Oxidation is a core technology for converting petroleum-based materials to useful chemicals of a higher oxidation state. Hydrogen peroxide (H_2O_2) is an ideal oxidant, because the atom efficiency is excellent and water is theoretically the sole co-product. However, H_2O_2 can be a clean oxidant only if it is used in a controlled manner without organic solvents and other toxic compounds. Thus, the discovery of an efficient catalyst and the choice of reaction conditions are the keys to realizing an ideal oxidation procedure. In this context, we developed various oxidation reactions with aqueous H_2O_2 under organic solvent- and halide-free conditions.



Hydrogen peroxide oxidation under organic solvent- and halide-free conditions

Development of Flexible Ceramics Gas Sensing Device

- Microfabrication of ceramics by solution lithography -

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We have successfully prepared tin dioxide (SnO_2) film showing an excellent gas sensing property against hydrogen on polymer substrate through a liquid phase process. Due to the formation of an ultrathin silicon dioxide (thickness is 2 nm or less) layer prior to the SnO_2 film deposition, the resulting film was tightly attached to the polymer surface and readily bended without cracking. Furthermore, the SnO_2 film was successfully arranged spatially onto the photolithographically micropatterned organosilane layer on the polymer substrate. Our process demonstrated here is not limited to the patterning of SnO_2, but is also applicable to other inorganic materials.


Flexible gas sensing material