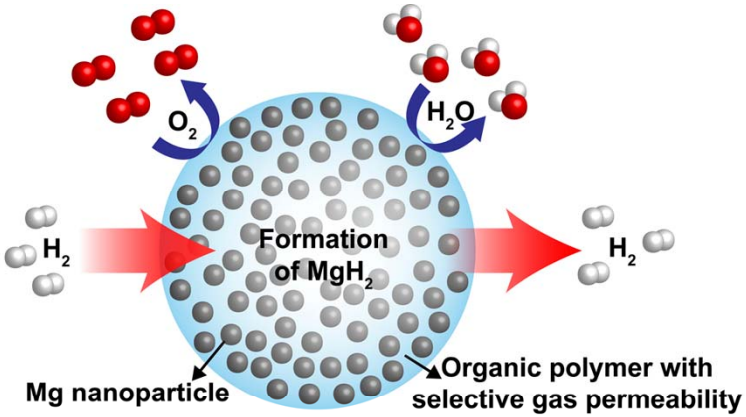
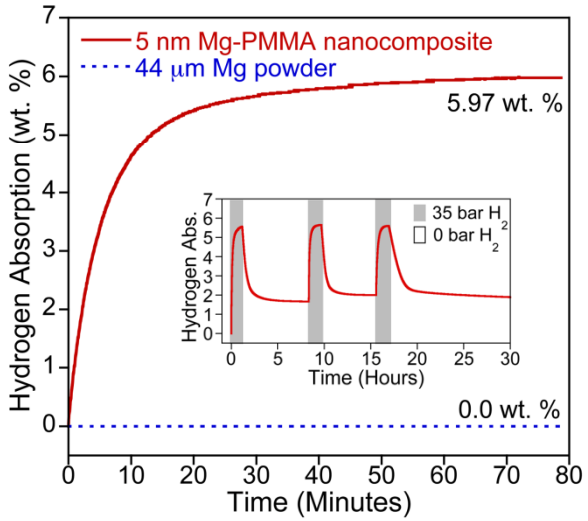
Designing air stable nanocomposites for H_2: a carbon-free energy carrier





- Between 1970-2004, annual global emissions of carbon dioxide have escalated by ~80%. Many strategies to mitigate CO_2 emissions, including carbon capture and storage and changing to less carbon intensive fuels such as hydrogen, will be critical.
- To replace gasoline as a fuel, hydrogen must be safely and densely stored yet easily released.
- An air stable magnesium nanocomposite was developed. Mg nanoparticles are embedded in a gas-selective polymer which has a H_2/O_2 permeability ratio of 42.9 at 35 °C, allowing H_2 in while preventing the Mg from being instantaneously oxidized by air.
- H_2 uptake was measured through 3 cycles, nanostructuring of the Mg obviated the need for heavy, expensive metal catalysts.
- The general synthetic method is flexible, allowing for material tailorability to fit the necessary application needs.

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