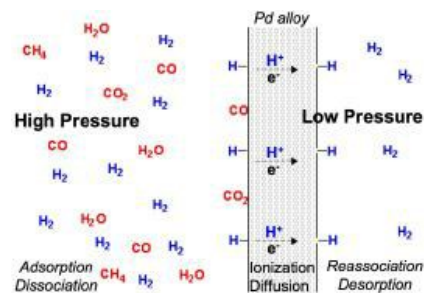


Hydrogen Purification

An important technical challenge that needs to be overcome, is how to deliver ultra-high purity hydrogen. Polymer Electrode Membrane (PEM) fuel cells are extremely sensitive to gas impurities and, for prolonged exposure, require a very pure hydrogen feed.



There are a range of techniques to purify hydrogen, however dense thin-metal membrane purifiers have a number of advantages: they are compact, have a low capital cost, and offer a one-stage high-purity hydrogen output.

However, the thin-metal membrane alloys currently used (e.g. Pd-Ag) are relatively thick (~25 microns) and need to be operated at high temperatures, making them unacceptably expensive in material and operating costs.

Our previous work has shown Pd-Rare-Earth alloys to be 3 times more permeable to hydrogen and to have superior mechanical properties than conventional alloys.

We are now investigating new Pd-based alloys with superior purification properties, reasonable tolerance to impurities such as sulphur, and a target operating temperature of about 250°C, that are able to be effectively deposited as thin-films onto a range of porous substrates.