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C1Po3B-02: Impacts of temperature on nitrogen adsorption of common cryogenic purification materials

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As hydrogen continues to gain adoption as a global energy carrier, a renewed focus on hydrogen liquefaction technologies has emerged. The hydrogen liquefaction process requires extremely pure hydrogen feed gas to prevent the freeze out of impurities which can damage equipment. This study investigates the impact of temperature on the nitrogen adsorption performance of three widely used materials: Silica Gel, activated carbon, and 5A zeolite. The aim is to examine the thermal dependence of nitrogen uptake in these materials, providing insights into their efficiency and suitability for cryogenic purification of hydrogen. Comparative results for equilibrium capacity at temperatures between 80K and 110K are presented.

Author: SAELID, Glynne (Plug Power)

Co-authors: Dr RICHARDSON, Ian (Plug Power); Dr SHOKRIAN, Mazdak (Plug Power)

Presenter: Dr RICHARDSON, Ian (Plug Power)

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