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Progress into energy storage technology: About the carborundum foam ceramic structure and the fuel cells capacity

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The present research is about carborundum foam ceramic (SiC) and its huge energy storage capacity in industrial approaches. Initially observed in 1824 by Jöns J Berzelius in a synthetic diamond experience by a parasite reaction between carbon and silica, this porous material is found much utilized since the industry of 1890, raison to its precious properties, such as its powerful resistivity to thermal shocks and chemical oxidation to name but a few. SiC could be produced at various specific surfaces, as between 10 and 20 m^2/g. Similarly, the granulometric composition of the used mixture powder could control its porosity. For industrial applications (as catalysts), the porosity is ranged between 37% and 45%. Regarding the permeability the key factor for most industrial applications, a large range of the latter could be denoted. Complement to these properties and following the fuel cells development in the recent years, such a material could be adopted against the storage instability problem. As observed with various fluid natures, it was established that the energy storage at low double-diffusive buoyancies consists, usually of a steady state ratio, easily controlled at pilot processes (and promotive for modest applications). By searching for a better capacity ratio, following the increase in the buoyancy impact, the fuel cell structure could become unstable, leading to a huge loss in both the process energy cost and the used materials. Facing to such a big challenge, our alternative will be themo-mechanical. By taking the annulus shapes as an example, the generation of a high diffusive gradient between the annulus limits could increase the buoyancy efficiency and the energy ratio consequently. Of course critical situations will be reached, as the inner sub-flow regimes over the energy storage process. Against such a part, the full cell shape could light-up the perfect solution. In view of the fact that the nature of industrial processes is often non-linear, extremely complex and not sufficiently recognized, the development of primary conditions for energy storage optimization is of practical significance. As such, our presentation at Advanced Energy Materials Conference, at Zurich, Switzerland, will be undertaken to extend the optimum carborundum foam structure & buoyancy range to make accurate information about full cells stability and the evolution of the energy storage ratio during the operation time.

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