Hydrogen adsorption on graphene foam synthesized by combustion of sodium ethoxide

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Hydrogen storage is a crucial technology for the realization of a carbon-neutral society. However, few materials have been able to approach useful hydrogen storage capacity at reasonable temperatures and pressures. Graphene has an extremely high surface-area-to weight ratio, is strong, cheap, chemically inert, and environmentally benign. As such it may be an ideal substrate for hydrogen storage. Here we present synthesis of graphene foam by combustion of sodium ethoxide. This technique is low-cost, scalable, and results in a three-dimensional graphene network with a surface area of more than 1200 m^2/g. It is applied as a hydrogen storage material at liquid nitrogen temperature, with a capacity of 2.1 wt%.

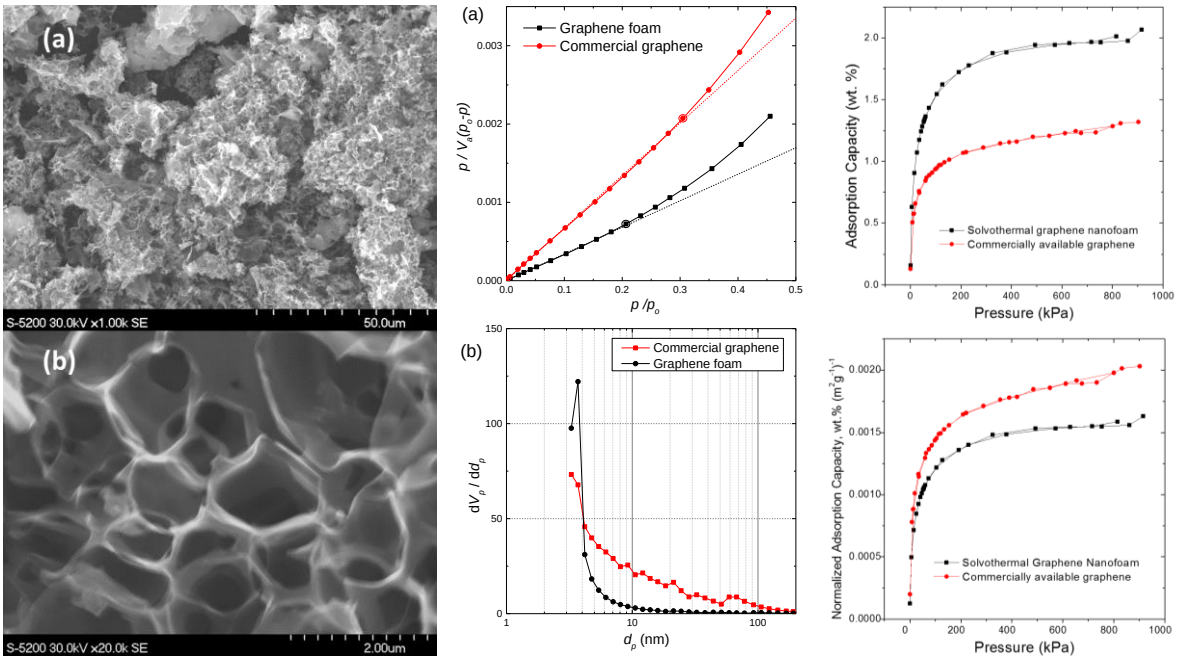

Figure 1. Scanning electron microscopy showing the 3D architecture of our graphene foam; nitrogen isotherms showing the BET surface area and BJH poresize distribution; hydrogen sorption isotherms showing the storage capacity before and after normalization to the surface area.

References:

Lyth SM, Shao H, Liu J, Sasaki K, Akiba E., **Hydrogen adsorption on graphene foam synthesized by combustion of sodium ethoxide**, *International Journal of Hydrogen Energy* (2013), http://dx.doi.org/10.1016/j.ijhydene.2013.10.044