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TITLE

Metal doping of cross-linked graphene and graphene oxide for hydrogen storage

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Porous graphene (G) and graphene oxide (GO) have become increasingly popular in the storing of hydrogen at room temperature. Graphene is a modified form of graphite that takes the form of sheets with less agglomeration than its respective graphite form. This form has the potential for high surface area and storage capabilities. The storage of hydrogen at room temperature could be optimized by increasing the surface area with an adsorption enthalpy between 20-40 KJ/mol. In order to increase the surface area, it is essential to place organic spacers in between the graphene sheets, in turn creating a porous framework through cross-linking. The organic spacers chosen are unique in nature where the material is being cross-linked. Once G and GO have been successfully cross-linked, doping of the materials with calcium and lithium could be performed. The metals doped on the surface of G and GO yield a material with an adsorption enthalpy in the desired range of 20-40 KJ/mol. We have doped the cross linked G and GO using the mentioned alkali metal (Li and Ca). The metal doped G and GO are characterized using X-Ray Diffraction and Scanning Electron Microscopy, The specific surface area, pore size distribution, and adsorption enthalpy of the synthesized G and GO doped materials have been calculated. Pressure-composition tests (PCT) of the G and GO have been made to understand the hydrogen storage capacity of each complex.

Biography

Anthony D'Angelo has completed his Bachelors of Science in Chemical Engineering at the University of South Florida. He is now working on his Masters of Science in the same field at the University of South Florida. He plans on attaining his Doctorate in Materials Science & Engineering. He has a passion for clean and renewable energy.