

Public Abstract

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Title:Fundamental building blocks of nanoporous networks from ultra-small-angle x-ray scattering (USAXS) and small-angle x-ray scattering (SAXS) experiments.

There are many different forms of alternative energy available and ready for consumption. What has not yet been fully developed are the mechanisms to safely store and extract alternative fuels.

Activated carbons are an economical porous material that can be used to store hydrogen and methane safely and reliably. These carbons are engineered to have pore widths that are about 1 nanometer wide.

There are not many measurement techniques capable of resolving or mapping out these tiny pores. We use ultra-small-angle x-ray scattering (USAXS) and small-angle x-ray scattering (SAXS) measurements to develop a methodology that provides two characteristic lengths of an individual nanopore. Our method allows us to measure the nominal width and length of pores. Our technique also allows us to assess the shape of the pore.

We find that activated carbons have features consistent with cylindrically shaped pores with widths of approximately 6 angstroms and lengths of approximately 20-25 angstroms.

Information about pore dimensions allow us to refine the fabrication process in order to optimize their storage capacity.