

## Carbon Cryogels: A Medium for Separations

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**Abstract:** Carbon cryogels exhibit high surface area and chemical robustness, which makes them potential materials for use in a wide range of applications that require a separation. Some of the current research has focused on determining the effect of reaction and processing conditions on the properties of the resulting carbon and to determine the environmental factor and atom economy. The ability to synthesize carbon cryogel microspheres with low polydispersity has been investigated with an emphasis on developing carbon cryogel liquid chromatography columns. The use of carbon cryogels as solid phase extraction media for environmental contaminants (i.e., atrazine, simazine, pyrene, phenanthrene, etc.) has been studied. Water pollution by heavy metal ions such as As, Cr, Cu, Pb, and Ti is an environmental concern due to associated health risks. Unlike other types of contamination, heavy metals do not decay, so remediation efforts must be performed to remove heavy metal contamination from the environment. To this end, we are developing carbon cryogel electrodes for use in the removal of heavy metal cations from aqueous solutions through electrochemically modified extraction. These applications for carbon cryogels as a medium for separations are a snapshot of several of the projects that have been investigated with undergraduate students.