

Properties of mesitylene confined in Silica Micro-spheres

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Abstract

Liquid and solid methane, due to their thermalization qualities, have often been considered as moderator materials. However, practical experience has shown that at sources that are operated at 10s of KW or more the radiation induces a polymerization process, which makes methane rather complicated to operate. Mesitylene has been discussed over the last 10 years as a possible substitute for methane. While mesitylene has proven to have a much better radiation resistance than methane, it still shows polymerization.

It is hypothesized that if mesitylene is confined the polymerization process can be stopped or at least hindered. Therefore, we have investigated mesitylene confined in silica micro-spheres. We will present inelastic neutron scattering data, small angle neutron scattering data and transmission measurements on mesitylene confined in silica micro-spheres as well as a measured spectrum of a moderator composed of this material.

We will discuss the impact of this confinement on the excitation spectrum of the material and on its total cross-section, as well as its potential usefulness as a moderator material.