

Motion in a cage as seen by inelastic neutron scattering

SCHOBER Helmut

ILL, France and Burkhard Renker, IFP,FZK, Germany

There are many ways an atom or molecule can be incorporated into a matrix. One of many possible criteria for classification is the influence the guests exert on the host matrix. In some cases the influence is that strong that the stability of the matrix itself relies on the presence of guests. This situation is e.g. found in clathrate hydrates. On the other end of the spectrum the adsorption of guests induces practically no perturbation of the matrix.

The physical properties as well as possible applications in all of these systems depend strongly on the dynamics. We will show how basic information of vibrational and diffusive properties can be obtained via inelastic neutron scattering. We will demonstrate the usefulness of this information for understanding stability and formation processes. Possible consequences for applications like gas storage and gas separation will be touched upon. Examples will include intercalation in fullerenes and nanotubes, hydrate clathrates as well as zeolites.