

Diffusion NMR: From catalysts to gelatin, a useful tool for exploring structure and dynamics in porous networks

Carmine D'Agostino

Department of Chemical Engineering and Biotechnology, University of Cambridge, Philippa Fawcett Drive, Cambridge, CB3 0AS, UK
*cd419@cam.ac.uk

Measurements and quantification of diffusion is crucial for understanding, designing and optimizing processes and product manufacturing. Several techniques have been developed over the years to quantify transport by diffusion in physical and chemical systems. Among the various methods, pulsed-field gradient (PFG) NMR is a very powerful tool for non-invasive measurements of diffusion coefficients, which can be applied to a wide variety of systems, some of which rather complex and inaccessible with other techniques. In this work several applications of the technique to systems of industrial relevance, including catalysts and gelatinous materials, will be presented. The technique can provide unique insights both on transport mechanisms and structural features of porous networks and how these features change during operation, which can be used for process and product design optimization.

