

^{57}Fe Mössbauer Spectrometry in the Characterization of Functional Nanocomposites

J.M. Greneche

*Institut des Molécules et Matériaux du Mans, UMR CNRS 6283, Le Mans Université
72085 Le Mans Cedex, France*

jean-marc.greneche@univ-lemans.fr

Since its discovery more than 60 years ago, ^{57}Fe Mössbauer spectrometry has received much attention and subsequently been widely applied in Fe-containing materials science and engineering, extending to other topics as organic and inorganic chemistry, biology, mineral and soil sciences. Indeed, this local probe technique is initially quite cheap and very easy to use due to its low quantity of samples but limited to powders and thin films in the case of the conventional transmission Mössbauer spectrometry and to the surface of massive systems in the case of Conversion Electron Mössbauer Spectrometry. In addition, Mössbauer spectrometry is very suitable for the determination of the number of Fe sites, their respective valency and spin states and magnetic moments: this allows to highlight structural, spin and magnetic phase transitions, provided that certain temperature, magnetic field and/or other facilities are associated to the spectrometer.

From some selected examples based on functional nanocomposites, we illustrate how ^{57}Fe Mössbauer spectrometry can bring relevant information from the hyperfine structure to characterize these materials and to understand the origin of some physical properties.