

In-situ Measurement for Magnetic Materials and Minerals Using Mössbauer Spectroscopy

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Mössbauer spectroscopy is a unique technique which is widely used for study not only various molecular including biomolecular systems, but also various other objects and materials containing Mössbauer isotopes (for instance, ^{57}Fe , ^{119}Sn , ^{121}Sb , ^{127}I , ^{197}Au , etc.). This technique provides very precise information about the electronic and magnetic state of the nuclei, chemical bonds, structure of local environment, etc. Iron is the most common transition element on earth. Many minerals contain iron as a main or as a substitution ion. ^{57}Fe Mössbauer spectroscopy allows the identification of appropriate iron-bearing minerals, the determination of their oxidation states or non-equivalent positions of iron, and the investigation of their magnetic behavior. Thus, Mössbauer spectroscopy complements standard methods of analysis of the chemical composition and structure of minerals, e.g. Recently, A new miniaturised Mössbauer spectrometer has been developed for laboratory, and industrial application such as astrobiology and geological exploration by Palancky University in Czech Republic and Gutenberg University in German. In this study, we introduce a variety of Mössbauer spectrometers, and those various applications.