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Development of Magnetization Detecting Electron Spin Resonance Method SATOSHI MATSUZAWA, HIROYUKI NOJIRI, Institute for Materials Research, Tohoku University, NOJIRI LAB TEAM — Electron spin resonance: ESR is a spectroscopy by using electromagnetic wave absorption in Zeeman splitted multiplet of spins. The split energy is determined by the resonance field and the line width is governed by relaxation and anisotropies. The absorption intensity is proportional to the population difference between the initial and the final states. These populations also determine the total z-component of magnetization of the system. It means that ESR absorption can be measured by magnetization under electromagnetic wave irradiation. This type of ESR is called magnetization detecting ESR: MDESER. We have developed two types MDESER, namely, SQUID-ESR and XMCD-ESR. XMCD is the abbreviation of X-ray Magnetic circular dichroism and is the method to measure magnetization in element and orbital selective manner. SQUID-ESR is easy to conduct by attaching radiation source to a conventional MPMS-SQUID machine. The advantage of SQUID-ESR is the evaluation of absolute value of ESR intensity. While, XMCD-ESR is very sensitive and can detect the magnetization of a few atomic layers. Details of the experimental systems and the test results will be presented.

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