

Development of in-situ elemental composition measurement instrument for future Mars lander

(火星着陸探査に向けた元素分析装置の開発)

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ABSTRACT

Recently, in-situ dating techniques without sample return missions have been developed. In-situ dating conducted by NASA's Curiosity rover on Mars is the only example of such measurements on planetary surface. Curiosity obtained the K concentration with an Alpha Particle X-ray Spectrometer (APXS) and the Ar concentration with a quadrupole mass spectrometer (QMS), and obtained the K-Ar age of a mudstone at the Gale crater. However, since this system is very complicated, a large rover is needed for operation. We are proposing a dating technique using Laser-induced breakdown spectroscopy (LIBS) for K measurement and QMS for Ar. Laser-induced breakdown spectroscopy (LIBS) is widely used for chemical composition analysis, and this technique has already been successfully used in ChemCam onboard Mars Curiosity.