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Identification of Iron Rusts on Rail by X-Ray Diffract

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Keywords	Corrugation , Rail , Railway , Raman Scattering , (XRD)
Abstract	A periodical unevenness of the running surface tunnel. One of the causes has been concluded induced by some kinds of iron oxides and oxyf has not been made clear yet. In this study, X-r attempted to identify iron rusts on the rail as a many railway companies.
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Identification of Iron Rusts on Rail Ana

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Keywords: Railway, Submarine tunnel, Rail, (Vibrational spectroscopy

Abstract. A periodical unevenness of the running submarine railway tunnel. One of the causes has friction and wheel load variation induced by so various coefficients of friction on the rail, though diffraction and Raman scattering spectroscopic analysis of rail as a process to solve the periodic unevenness

Introduction

On ascending slope of submarine railway tunnel, rusts on rails are occasionally formed. They are often called large but slight longitudinal roll-slip phenomenon. Load variation excited by trains passing on rail with friction between a wheel and a rail is regarded as the cause of oxyhydroxides with various coefficients of friction on the corrugated rail before lifetime of rail itself. On ascending slope of mountain tunnel, the authors have reported the rusts between the submarine tunnel and the mountain tunnel.

In this study, the kinds of iron oxides and oxyhydroxides on rail in both the submarine tunnel and mountain tunnel have been identified. Analytical methods to identify the kinds of rusts have been attempted. Especially, Raman scattering spectroscopy applying the vibrational energy between atoms or molecules has been focused on. These days, Raman spectroscopy is expected to be the on-site analyzing method.

After the identification of the rusts, artificial rusts were prepared. X-ray diffraction (XRD) and Raman scattering spectroscopy were compared. In this paper, the authors report the results.

Experiments

Sample Preparation Process. At first, iron specimens in the environment like submarine tunnel were prepared under wet conditions, dry conditions and 1% sodium chloride solution. The preparation methods for steel plate specimens were decided. They are shown in Fig. 1. We carried out XRD on the specimens, and then carried out Raman analysis on

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