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# Raman Spectroscopic Investigation of Friedel's Salt

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## Abstract

Friedel's salt (FS) forms upon chloride binding in monosulphoaluminate (AFm) phase. This removes chlorides from the pore solution, hence, delays the initiation of steel-bar corrosion. Apparently, characterising and, in particular, monitoring the formation and the status of FS facilitate the prediction of the service life of reinforced concrete structures. Raman spectroscopy offers a potential for investigating FS. The current work characterised FS, including the synthesised pure FS, and the FS formed in a Portland cement (PC) paste powder, using a bench-mounted Raman spectrometer. The results revealed the full Raman spectra of pure FS between 200 ~ 4000  $\text{cm}^{-1}$ , including the featured Raman bands at 534/568  $\text{cm}^{-1}$  and 783  $\text{cm}^{-1}$  which correspond to the Al-OH stretching and bending vibration of FS respectively. Furthermore, similar Raman bands of FS were identified in PC paste sample subjected to accelerated chloride attack, further confirming the potential of Raman spectroscopy for distinguishing FS in cementitious materials.

**Keywords:** Cementitious materials, Chloride attack, Friedel's salt, Raman spectroscopy.

## 1. Introduction

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