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# Quantitative Measurement of Paramagnetic Fe<sup>3+</sup> in Kaolinite

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**Abstract:** A method is proposed to measure the absolute concentration of paramagnetic Fe<sup>3+</sup> ions in kaolinite from various geochemical environments using powder X-band electron paramagnetic resonance (EPR) data. An Fe<sup>3+</sup>-doped corundum sample is used as a concentration standard. The Fe<sup>3+</sup> signal is calibrated by calculating the powder EPR spectra of Fe<sup>3+</sup> ions in corundum and low-defect kaolinite. The paramagnetic Fe<sup>3+</sup> concentration in other samples is obtained by an extrapolation procedure. This study provides a direct assessment of the iron distribution between isolated structural Fe<sup>3+</sup> ions and other iron species, such as Fe<sup>3+</sup> concentrated phases and Fe<sup>2+</sup> ions. The concentration of isolated structural Fe<sup>3+</sup> ranges between 200–3000 ppm and represents less than half of the total iron within kaolinite crystals.

**Key Words:** Electron Paramagnetic Resonance • EPR • Fe<sup>3+</sup> • Kaolinite

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