

# **GEOCHEMISTRY OF THE EPITHERMAL DICKITE (JEDLINA ZDROJ, LOWER SILESIA, POLAND): ISOLATED Fe<sup>3+</sup> IONS**

BRATISLAV Ž. TODOROVIĆ<sup>1</sup>, JUSTINA CIESIELCZUK<sup>2</sup>, NATAŠA R. ĐORĐEVIĆ<sup>3,\*</sup>,  
PAVLE I. PREMOVIĆ<sup>3</sup>, THIERRY ALLARD<sup>4</sup>

<sup>1</sup>Laboratory for General Chemistry, Faculty of Technology, University of Niš, P.O. Box 79, 16000  
Leskovac, Serbia

<sup>2</sup>Department of General Geology, Faculty of Earth Sciences, University of Silesia, Sosnowiec, Poland

<sup>3</sup>Laboratory for Geochemistry, Cosmochemistry and Astrochemistry, University of Niš, P. O. Box 224,  
18000 Niš, Serbia

<sup>4</sup>Institut de Mineralogie et Physique des Milieux Condensés, Université, Pierre et Marie Curie, Paris,  
France

\*[natasapejko@yahoo.com](mailto:natasapejko@yahoo.com)

A preliminary geochemical study of a dickite concentrate from the outcropping vein site at Jedlina Zdroj was carried out, employing X-ray powder diffraction analysis, Fourier transform infrared spectroscopy and scanning electron microscopy/energy dispersive spectrometry. The mineralogy of this concentrate is comparatively simple, dickite being the principal component (ca. 91% of total sample) with a minor amount of goethite.

The untreated dickite concentrate showed a complex electron spin resonance (ESR) signal around  $g=4$ . Such an ESR pattern has been found frequently for isolated Fe<sup>3+</sup> ions in a well-ordered kaolinite structure, substituting for Al<sup>3+</sup> in octahedral sheets. These Fe<sup>3+</sup> ions were resistant against chemical treatment by cold/hot HCl, but after treatment by the hot HF/HCl solution, their ESR signals disappeared, indicating that they are probably in the dickite structure.

Substantial proportions of Fe<sup>3+</sup> in the dickite matrix were probably contained in original hydrothermal (acid-sulfate) solution which was diluted by mixing with a groundwater, forming an epithermal solution. Both the goethite and Fe<sup>3+</sup> incorporated into the dickite structure imply that the epithermal formation solution was oxygenated.

Keywords: dickite, Jedlina Zdroj, Fe<sup>3+</sup>.