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$^{3+}$ ions in a well-ordered kaolinite structure, substituting for Al$^{3+}$ in octahedral sheets. These Fe$^{3+}$ 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$^{3+}$ 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$^{3+}$ incorporated into the dickite structure imply that the epithermal formation solution was oxygenated.

Keywords: dickite, Jedlina Zdroj, Fe$^{3+}$.