



Photolysis of iron(III)-organic complexes in cloud droplets and deliquescent particles

C. Weller and H. Herrmann

Leibniz-Institut für Troposphärenforschung, Chemistry, Leipzig, Germany (weller@tropos.de)

Iron and suitable coordination compounds for complexation such as carboxylic acids are ubiquitous in atmospheric waters. The forming iron-organic complexes are very good absorbers in the UV-VIS actinic region and therefore highly photoreactive. The photoreduction of an iron(III)-organic complex results into the production of an organic radical which can take part in further radical chain reactions and the formation of iron(II), whose budget is important for the Fenton reaction. Accordingly, iron complex photochemistry is involved in radical producing processes and the decomposition of the coordination compounds, which makes it interesting for atmospheric aqueous phase chemistry.

Several iron-complexes with environmentally relevant coordination compounds e.g., oxalate, malonate, succinate, pyruvate and glyoxalate have been flash-photolyzed with an excimer laser at wavelengths 308 and 351 nm. Flash photolysis holds the advantage that formed products are not irradiated as compared to continuous wave photolysis studies. Photochemically produced Fe^{2+} has been measured by UV-VIS spectrometry as $\text{Fe}(\text{phenantroline})_3^{2+}$ and Fe^{2+} overall effective quantum yields have been calculated with the measured energy of the excimer laser pulse and the initial concentration of the iron-complexes obtained by a speciation program.