

A violet mixed-valence copper-mercaptoethylamine complex generated electrochemically or by reversible interaction with oxygen

Loeb, Barbara

Crivelli, Irma

Andrade, Carlos

The synthesis, characterization and the reversible interaction with oxygen of a Cu(I)-mercaptoethylamine complex (I) in aqueous solution and room temperature is reported. As a result of the interaction with oxygen a violet species II is formed which has a similar absorption spectrum ($\lambda_{\text{max}} = 500 \text{ nm}$) to a violet species III obtained electrochemically from a solution of the Cu-mercaptoethylamine complex in a nitrogen atmosphere. In the absence of dissolved oxygen both violet species are stable but in presence of air they decompose into a greenish-white precipitate which does not contain the mercaptoethylamine ligand in its structure. A mechanism for the complex I-oxygen interaction is proposed which involves a superoxo mixed-valence species as intermediate. The electronic assignment of the 500 nm absorption band is also discussed. The remarkable special characteristics, i.e. (i) the simplicity of the ligand containing a soft donor atom; (ii) the fact that the reversible uptake of oxygen