

## **The reduction of aqueous Au<sup>3+</sup> by sulfide minerals and green rust phases**

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### **ABSTRACT**

The reactions of Au<sup>3+</sup> with green rust, stibnite, pyrite, and chalcopyrite were investigated in the laboratory and the size of the gold clusters formed was measured using extended X-ray absorption fine structure (EXAFS) spectroscopy, scanning electron microscopy (SEM), and transmission electron microscopy (TEM). The individual clusters produced were between approximately 29 Å and 77 Å in diameter and may occur individually or as composite clusters from hundreds to thousands of angstroms in size. This work shows that it is possible to form “invisible” gold through reduction of Au<sup>3+</sup> by green rust phases and the surfaces of sulfide minerals.