

**Formation of gold-bearing sulfides of copper  
in connection with a problem of «invisible gold»: experimental study**

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In the system saturated with the metal gold, copper sulfides (covellite CuS, digenite  $\text{Cu}_{9+x}\text{S}_5$ , and chalcocite  $\text{Cu}_2\text{S}$ ) were obtained by the method of hydrothermal synthesis. It is established that under conditions of experiments (450°C, 700–1150 bar) the contents of «invisible» (isomorphic or submicron) gold in digenite and chalcocite are lower than the limit of detection of X-ray spectral microanalysis (<0.008 wt.%). Covellite, on the other hand, can contain to 0.3 wt. % of gold evenly distributed over the volume of the solid phase. The content of gold in covellite increases as the sulfur volatility grows.

*Key words: hydrothermal processes, sulfides, experiment, chalcocite, digenite, covellite, gold, isomorphism*

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