

## Precious metals in sulphides from large Svetlinsk Au-Te deposit, Urals: A LA-ICP-MS study

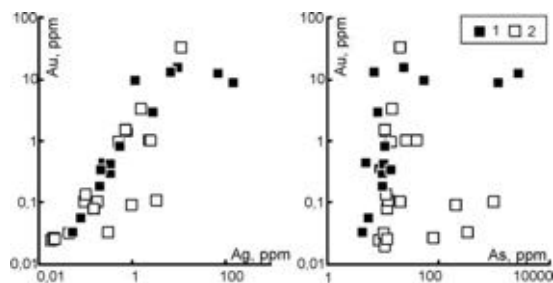
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The Svetlinsk large gold-telluride deposit (54°17'35"N, 60°25'20"E) is located within the deeply metamorphosed (up to amphibolitic facies) volcano-sedimentary rocks (D-C). The gold ores can be divided into two types: (1) disseminated pyrite-pyrrhotite in the host rocks ( $C_{Au}$  up to 1 g/t); (2) sulphide-quartz veins and veinlets, superimposed on the disseminated mineralization (av.  $C_{Au}$ =0.8-2.5 g/t).

Contents of trace elements in pyrite and chalcopyrite from early disseminated ore and late sulphide-quartz veins were determined by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) in Université du Québec à Chicoutimi, Canada and IGEM RAS, Russia (standarts mass1, Laflamme, mss5 were used). Early pyrite contains (in ppm): Au 0.03-16.0, Ag up to 146.3, As 4.3-58.2 (single analyses 1180 and 2723), Sb 0-50.8, Te 4.6-192.2, Bi up to 76.4, Pd up to 0.06-0.09. Late pyrite contains (ppm): Au 0.03-3.36 (33.8), Ag 0.09-2.48 (11.6), As 8.3-330 (1004), Sb 0.4-9.2, Te 1.9-152, Bi 0.1-0.6, Pt up to 0.09. Vein chalcopyrite contains (ppm): Au 0.1-0.2, Ag 179-441, In 11.8-41, Pd 1.41-2.53. The early pyrite is enriched in Au, Ag, Pd, Sb, Bi, Te, while late pyrite is richer As and Pt.



**Figure 1:** Distribution of Au, As and Ag in disseminated (1) and vein (2) pyrite according to LA-ICP-MS analyses.

At  $Au \leq 10$  ppm the direct correlation between the contents of Au and Ag (Fig. 1), as well as Au, Ag with Te was found for early pyrite. This may indicate the presence of nanoscale inclusions of petzite  $Ag_3AuTe_2$  and hessite  $Ag_2Te$  in pyrite. At higher concentrations ( $Au > 10$  ppm) the gold nanoparticles probably occur in both pyrites. At Au from 0.01 to 0.1 ppm Au-As correlation possibly suggests structurally bound Au in pyrite.