The upper limit of gold recovery

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Some part of gold in most deposits occurs as very small grains ($<n*1\mu m$), as disseminated in gold-bearing sulphides and as grains entrapped in non-ore minerals. This unrecoverable part of gold defines the upper limit of gold recovery (ULR) in cyanidation or flotation of routine feed (usual size $<74\mu m$). In many cases the ULR is convenient parameter to be used as a key characteristic of ores in making technological and economical decisions.

Commonly, the selective dissolution technology is the standard tool to determine the ULR. However, this method consumes much time and labour that is why it is mostly used for testing of mixed samples. The resulting information is usually insufficient to reveal fully enough the variability of ULR within the ore body. This lack of information creates a risk of unpredictable and uncontrolled recovery fluctuations within gold beneficiation process.

A new technique to determine the ULR has been tested. This technique is based on the "ppm-mineralogy" technology and consists of two main steps: (1) preparation of special concentrate free of recoverable gold and containing the unrecoverable gold (trapped in non-ore minerals, dispersed in sulphides and smaller than $3\mu m$ nuggets); (2) determination of gold and sulphur concentrations in the concentrate.

The proposed technique allows determining the ULR with capacity ten times higher than the traditional selective dissolution technique; therefore, it provides the possibility of mapping this parameter in any required scale on any kind of samples and can be used as a part of Ore Audit Technologies.