Geochemical features of “invisible gold” in pyrites from the Akeshi and Kasuga deposits, Kagoshima, Japan

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The occurrence of gold in ore is one of the most important information in gold deposit research. This information allows us to optimize beneficiation and smelting processes, as well as providing valuable insights into the mineralization mechanism, which can improve exploration strategies (e.g., [1]).

In hydrothermal gold deposits, gold is not always visible as native gold, electrum, caraverite (AuTe2) or other gold minerals. In many cases, it also exists as submicrometer-size inclusions and solid solution in other minerals, which is so-called “*invisible gold*” [2]. Pyrite is the most ubiquitous and well-known host mineral for this invisible gold, and its trace element geochemistry has been increasingly recognized as a useful tool to understand the mineralization processes (e.g., [3]).

In this study, we report the geochemical features of invisible gold in pyrites collected from the Akeshi and Kasuga deposits. These deposits, located in the southern part of the Kagoshima Prefecture, Japan, are currently under operation, and are classified as high-sulfidation gold deposits. In both Akeshi and Kasuga, gold minerals are only reported from high-grade ores, and other hosts of gold in lower-grade ores remain still uncertain [4]. Pyrite is the most common sulfide mineral in these deposits. Here, we report the results of EPMA (Electron Probe Micro Analyzer) and LA-ICP-MS (Laser Ablation Inductively Coupled Plasma Mass Spectrometry) trace element analyses of pyrite, in order to determine their mineralization processes.

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