Quantitative analyses of tungsten in synthetic fluid inclusions by SXRF technique

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The authors have analyzed concentrations of heavy metals in individual fluid inclusion trapped in quartz at the vein-type W-Sn deposit of the Takatori mine by means of synchrotron X-ray fluoresce (SXRF) method. Early stage fluid contains very high concentration (1,000-10,000 ppm) of metals such as W, Fe, Mn, Cu and Zn. Concentrations of these metals suddenly dropped to several hundred ppm at middle stage, and those of late stage fluid were below the detection limit (bellow 50 ppm). Our data suggest that ore-forming fluid responsible for the Takatori deposit must be magmatic origin of S-type granitic rock; composition of fluid has changed during mineralization through precipitation of minerals and reaction with country rock. Quantitative analyses of tungsten by SXRF were based on empirical factors derived from experimentally determined correction curves for Cu and Zn (Nagaseki et al., 2006). In order to improve the analytical precision, we tried to analyze W content in synthetic fluid inclusions of known composition, and have successfully obtained correction curve to show relationship among the intensity of SXRF, concentration of W and depth of fluid inclusion from the surface of mother crystal. Syntheses of fluid inclusion were carried out as follows. Quartz rod, Na_2WO_4 solution of 500-10,000 ppm W, and quartz powder were sealed in gold capsule. It was heated at 500 degreeC and 120 MPa for 10 days. Tungsten contents in fluid inclusion trapped in polished thinsections prepared from quartz rod were analyzed by SXRF. Experimentally determined correction curve of this study was applied to fluid inclusions at the Takatori deposit. Revised data of W content agree with our previous data obtained using empirical factors.