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SIMS microanalyses for Au in silicates

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ABSTRACT

Secondary ion mass spectrometry (SIMS) analyses of silicates show high sensitivity for Au when an alkali metal primary beam is used in conjunction with detection of negative secondary ions and an electron flood gun for charge neutralization. Two approaches to analysis give good results: (1) Cs primary ions and high mass resolution analysis of secondary ions, and (2) K primary ions and energy filtering (50 ± 20 eV) of the secondary ions. The latter technique shows slightly higher sensitivity but requires modification of off-the-shelf SIMS instruments whereas the former technique is accessible to most magnetic sector SIMS as delivered. Study of National Institute of Standards and Technology glasses indicates detection levels below 100 ppb by weight (~ 10 ppb atomic).