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## Current Capabilities of Microanalytical Technology as Applied to Geomaterials

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Technological progress over recent years has brought a number of new instrumental methods for characterizing the chemical or isotopic compositions of materials at or below the nanogram sampling scale, roughly equivalent to a volume of 400  $\mu\text{m}^2$  in a silicate mineral. A decade ago instrumentation capable of working at such a fine scale was largely limited to electron-based, ion-based or optical / vibrational spectroscopic methods. Along side steady advances in laser ablation technology, recent years have also witnessed the introduction of techniques employing X-rays, ion beam etching and pulsed ion sources for characterizing complex materials at the sub-micron scale.

Current top-end equipment has now advanced to the point where the analytical geochemist can characterize materials even at the atomic scale; the total number of atoms available for analysis has in some instances become the limiting factor defining sampling mass and the limit of quantification. This contribution reviews the current spectrum of available analytical technologies and uses current trends to look into the future. A particular focus of this talk will be the current capabilities of secondary ion mass spectrometry and low uncertainty isotopic analyses operating at 200 picogram sampling masses.

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