Analytical Conditions for the Laser Ablation Induced Coupled-Plasma Mass Spectrometry (LA-ICP-MS)

Rare Earth Element analyses were obtained using an ELAN6000 quadrupole ICP-MS coupled to a UP213 nm laser ablation system at the University of Alberta. The optimization of ICP-MS instrument parameters (RF power 1200 W, peak hopping acquisition, 50 ms dwell time) was achieved by ablating the NIST 612 glass standard.

The NIST 612 standard and Rare Earth Element Glasses were ablated using a 40 µm spot size, 5 Hz repetition rate and energy density of ~13 J/cm2. Ablation runs were conducted in a mixed He/Ar atmosphere (ratio of 0.5:0.1 L/min), and mixed with Ar (1.03 L/min) prior to entering the torch assembly. The laser ablation cell was flushed with a higher flow rate of He (up to 0.9 L/min) for approximately 1 min in between laser ablation runs to ensure adequate particle wash-out. A typical analysis consisted of a ~25 s background measurement followed by ablation for ~40 s. The NIST 612 glass standard was used as the external calibration standard.