

Precise in situ U-Pb zircon dating at 5 micron scale by laser ablation multiple ion counter inductively coupled plasma mass spectrometry (LA-MIC-ICPMS)

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Laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) is a powerfully micro-analytical tool and widely used because it can do fast and precisely in-situ isotopic analysis at 30 ~ 80 micron scales. Here we report a new method for U-Pb dating of zircon with a high resolution at a horizontal scale of 5 μm using 193 nm ArF excimer laser ablation multiple ion counter inductively coupled plasma mass spectrometry (LA-MIC-ICPMS). The new technique allows routine analysis with a ablating spot diameter of 5 μm and ablation time of ~17 s. The dating results for Phalaborwa, GJ-1, Temora, Plesovice, Qinghu and SK-10 zircons are identical to the recommended ages within analytical uncertainties with precision better than 1%.

This technique has comparable high horizontal resolution with the SIMS U-Pb dating technique, but is much more cheap, rapid and simple. Therefore, it should have widely applications to high-resolution U-Pb dating of the tiny or complex zircon grains with small cores or narrow zones.