

**THE SECOND CONFERENCE ON THE LUNAR HIGHLANDS CRUST AND NEW DIRECTIONS
The distribution of Mg-spinel across the Moon and constraints on crustal origin†**

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ABSTRACT

A robust assessment is made of the distribution and (spatially resolved) geologic context for the newly identified rock type on the Moon, a Mg-spinel-bearing anorthosite (pink-spinel anorthosite, PSA). Essential criteria for confirmed detection of Mg-spinel using spectroscopic techniques are presented and these criteria are applied to recent data from the Moon Mineralogy Mapper. Altogether, 23 regions containing confirmed exposures of the new Mg-spinel rock type are identified. All exposures are in highly feldspathic terrain and are small—a few hundred meters—but distinct and verifiable, most resulting from multiple measurements. Each confirmed detection is classified according to geologic context along with other lithologies identified in the same locale. Confirmed locations include areas along the inner rings of four mascon basins, knobs within central peaks of a few craters, and dispersed exposures within the terraced walls of several large craters. Unexpected detections of Mg-spinel are also found at a few areas of hypothesized non-mare volcanism. The small Mg-spinel exposures are shown to be global in distribution, but generally associated with areas of thin crust. Confirmation of Mg-spinel exposures as part of the inner ring of four mascon basins indicates this PSA rock type is principally of lower crust origin and predates the basin-forming era.

Keywords: Spinel, lunar crust, spectroscopy, Moon Mineralogy Mapper (M³)