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Geochemical Fingerprinting of Lithium Pegmatites: A Whole-Rock Perspective

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A global compilation of whole-rock geochemistry from Li pegmatites is underdeveloped relative to other more abundant, fine-grained rock types, such as arc-related granites and oceanic basalts. A globally representative whole-rock geochemical database comprising mineralized spodumene pegmatites, with associated analytical and geological metadata, has been compiled for later use in machine learning and statistical exploratory analyses. Analytical results of multi-element geochemistry from a range of laboratory workflows as well as tectonic setting at time of formation, host-rock metamorphic grade, and mineralogical characteristics of zones intra-pegmatite have been compiled from international journal articles as well as government and private company databases from Australia. This global database will provide the foundation to (1) test commonly applied classification and economic assessment workflows; (2) evaluate existing lithium pegmatite paragenesis models; and (3) compare between differing intrusive phases, melt sources, and geological settings of critical mineral prospective pegmatites globally.