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PGE Mineralization in the Lake Owen Complex, Southeastern Wyoming

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Most of the platinum group elements (PGEs) are included in the United States Geological Survey's list of critical minerals, making characterization of their sources an economic and scientific priority. Layered mafic intrusions are the primary geologic hosts for PGE deposits, but factors that control how PGEs become concentrated in smaller intrusions are poorly understood. The Lake Owen Mafic Intrusive Complex (LOC), located in the Medicine Bow Mountains in southeastern Wyoming, hosts Fe-Ti rich gabbros that contain significant PGE mineralization, and nearby mafic intrusions have historically produced Cu, Ag, Au, Pt and Pd. This study aims to understand the relationship between oxygen fugacity (fO_2) and PGE distribution in the Lake Owen Complex in order to better understand the magmatic conditions that lead to PGE mineralization. Samples from multiple units of the LOC were collected across magmatic layers, and whole-rock geochemistry, petrographic/petrogenetic analysis, and PGE assays are presented. Fe-Ti oxide compositions were measured by an electron probe microanalyzer (EPMA), and fO_2 was calculated via the methods of Ghiorso & Evans (2008) and Arató & Audétat (2017). These data will help us better evaluate the impact that fO_2 has on PGE concentration in the LOC and other layered mafic intrusive complexes.