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**Rare-earth element (REE) mineralization in  
Labrador: a review of geological settings,  
features, and exploration results**

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Since 2007, increased interest in exploration for deposits of Rare-Earth Elements (REE, i.e., La, Ce, Pr, Nd, Sm, Nd, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu) and associated rare metals (RM, e.g., Zr, Y, Nb, and Be) has been driven by commodity price increases linked to demand-supply imbalance. In Labrador and adjacent Québec, this has led to renewed evaluation of previously-defined deposits, and to grass-roots activity in prospective but unexplored regions. REE deposits in this region are all associated with peralkaline igneous suites of known or presumed Mesoproterozoic age, which in part represent the extension of the well-known Gardar igneous province in Greenland.

The largest resource sits near the Québec-Labrador border at Strange Lake, hosted by a ~1240 Ma peralkaline ring complex. Previous exploration outlined 56 Mt of 2.9% ZrO<sub>2</sub>, 0.38% Y<sub>2</sub>O<sub>3</sub>, 0.31% Nb<sub>2</sub>O<sub>5</sub>, 0.08% BeO, and ~0.54% total REE oxides (TREO; Y<sub>2</sub>O<sub>3</sub> excluded), including a smaller high-grade near-surface zone containing up to 1% Y<sub>2</sub>O<sub>3</sub> and 1.3% TREO. The deposit is presently exempt mineral lands (EML), but similar mineralization a few kilometres inside Québec is now part of an advanced exploration project, where substantial resources of similar grade are defined. Strange Lake is enriched in the more valuable “heavy” REE, which make up about 30% of total REE oxides (excluding Y<sub>2</sub>O<sub>3</sub>). The potential for definition of large bulk-tonnage resources in this complex is good. REE-Nb-Be deposits also occur in central Labrador, in the ~1330 Ma volcanic rocks of the Letitia Lake Group and the coeval Red Wine Intrusive Suite. The original geological relationships are locally obscured by locally intense Grenvillian deformation, but mineralization is still viewed as broadly syngenetic with respect to host peralkaline suites. Volcanic-related mineralization is enriched in Be and light REE, but mineralization in

undersaturated metasyenites is entirely different, consisting of disseminated to semi-massive eudialyte (Na-Ca-Zr silicate). This style of mineralization is enriched in Zr and heavy REE, and could be the cumulate counterpart to the incompatible-element-enriched association seen at inferred higher levels. Outside these previously defined areas, early-stage exploration programs have given encouraging results. In southeastern Labrador, at least two styles of mineralization are defined in the Port Hope Simpson area, and these also represent contrasting light-REE- and heavy-REE-enriched signatures, hosted by felsic gneisses and later pegmatites, respectively. Prospecting discoveries in correlative areas of central Labrador suggest that the Grenville Province as a whole demands evaluation. A remote stretch of territory near the border, within the largely unmapped Mistastin Batholith, is now known to contain smaller (later?) bodies of compositionally evolved granite, associated with locally high-grade REE mineralization. In conjunction with other discoveries in Québec, exploration results indicate that this entire region of the Canadian Shield represents an important target area for deposits of this type.