

Highly evolved S type granite : Selim Granite, Main Range Batholith, Peninsular Malaysia

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Abstract: The Selim granite consists of coarse grained porphyritic biotite granite to medium to fine grained granite. Both granites overlap in many of the major element contents especially SiO₂. The coarse grained porphyritic biotite granite has higher Fe₂O₃ and Na₂O and has lower FeO compared to the medium to fine grained granite. Ba and Rb increases from the coarse grained porphyritic granite to equigranular medium to fine grained granite. Both granites are controlled by the same mineral assemblage during magmatic evolution that is K-feldspar, plagioclase and biotite. REE profile show that both granites may represent the evolved part of the Western Belt Granite. In all patterns, four elemental groups (La–Nd, Nd–Gd, Gd–Er, Er–Lu) form four distinct convex patterns. This pattern also known as tetrad REE effects, are not observed in common rock types, but are well documented in highly differentiated rocks with strong hydrothermal interaction (including pegmatite). The tetrad effect develops parallel to granite evolution, and significant tetrad effects are strictly confined to highly differentiated samples. The strong decrease of Eu concentrations in highly evolved rocks suggests that Eu fractionates between the residual melt and a coexisting aqueous high-temperature fluid. The effect has been progressively recognized, particularly for granitic rocks which have undergone high degree of fractional crystallisation, hydrothermal alteration and mineralization. This feature is magmatic, inherited from crystallization of melt with the tetrad effect already produced and hardly be formed by post-magmatic water–rock interaction.