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## **Mineralogy, Petrology, Geochemistry (Domain B)**

*[Note: Examples given below are descriptive only and are not all-inclusive lists of items]*

### **B-1. Mineralogy**

- B-1.1 Mineral groups (e.g., silicates, oxides, carbonates, sulfides)
- B-1.2 Mineral chemical and physical properties (e.g., composition, density, hardness, magnetism, luminescence, anisotropy related to crystal structure)
- B-1.3 Hazardous minerals and processes (e.g., asbestiform minerals, Pb-bearing minerals, silicosis)
- B-1.4 Material characterization methods (e.g., X-Ray Diffraction, X-Ray Fluorescence, ICP-MS, Scanning Electron Microscope)

### **B-2. Igneous petrology**

- B-2.1 Igneous rock classification (e.g., intrusive and extrusive, mineral- and chemistry-based classification schemes)
- B-2.2 Magma evolution and phase diagrams (e.g., fractionation, nucleation, exsolution)
- B-2.3 Igneous petrogenesis and tectonic settings (e.g., mid-ocean ridge spreading centers, subduction zone volcanism, hotspots)
- B-2.4 Volcano types, eruption styles and volcanic deposits (e.g., stratovolcanoes, fire fountains, volcanic explosivity index)

### **B-3. Sedimentary petrology**

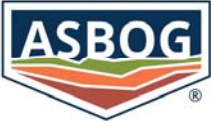
- B-3.1 Sedimentary rock classification (e.g., siliciclastic, carbonates, evaporites, biochemical)
- B-3.2 Mineralogy of sediment & sedimentary rocks (e.g., common mineral occurrences in different environmental settings)
- B-3.3 Diagenesis (e.g., common clay minerals, oxides and oxyhydroxides, alteration of silicate minerals, redoximorphic features)

### **B-4. Metamorphic petrology**

- B-4.1 Metamorphic rock classification (e.g., foliated and non-foliated)
- B-4.2 Metamorphic facies and tectonic regimes (e.g., greenschist, blueschist, granulite)
- B-4.3 Mineral/metamorphic rock associations (e.g., index minerals and associations)

### **B-5. Geochemistry**

- B-5.1 Chemical composition of the Earth's layers (e.g., most common elements in Earth's crust, mantle, and core)
- B-5.2 Element classification and associations (e.g., halides, transition elements, noble elements)
- B-5.3 Chemical weathering (e.g., Reduction-Oxidation reactions, dissolution and reprecipitation reactions, hydrothermal alteration)
- B-5.4 Stability diagrams (e.g., pH/Eh diagrams, P-T diagrams, T-X<sub>i</sub>-diagrams)



B-5.5 Isotope geochemistry and geochronological techniques (e.g., U-Pb, K-Ar, Rb-Sr, <sup>14</sup>C methods, and optically stimulated luminescence)

B-6. Project planning and development (***PG Only***):

B-6.1 Scope of work and cost estimate

B-6.2 Literature and regulatory review

B-6.3 Site-specific maps (GIS) and health & safety

B-6.4 Site-specific data