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SURFACE PROPERTIES AND CLAYS IN THE EARTH SCIENCES

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ABSTRACT

Clays and similar materials are extremely important in many areas of the earth sciences. In the search for minerals and energy resources in places as diverse as geothermal areas and permafrost regions, they dominate certain types of exploration. In permafrost, clays are often the dominant constituents of the material, and the interactions at the surfaces of the clays dominate and determine the physical properties. In geothermal areas, the alteration products lining the pore walls and cracks of the host rock behave analogously, sometimes drastically altering the thermodynamic behavior of the system. In sulfide mineralization, uranium/thorium deposition, and others areas, similar clay/rock systems arise. The electrical properties of many earth materials are particularly sensitive to the behavior of the clays. Because many geophysical exploration techniques rely upon measuring electrical properties, pertinent examples and the major mechanisms will be briefly reviewed.