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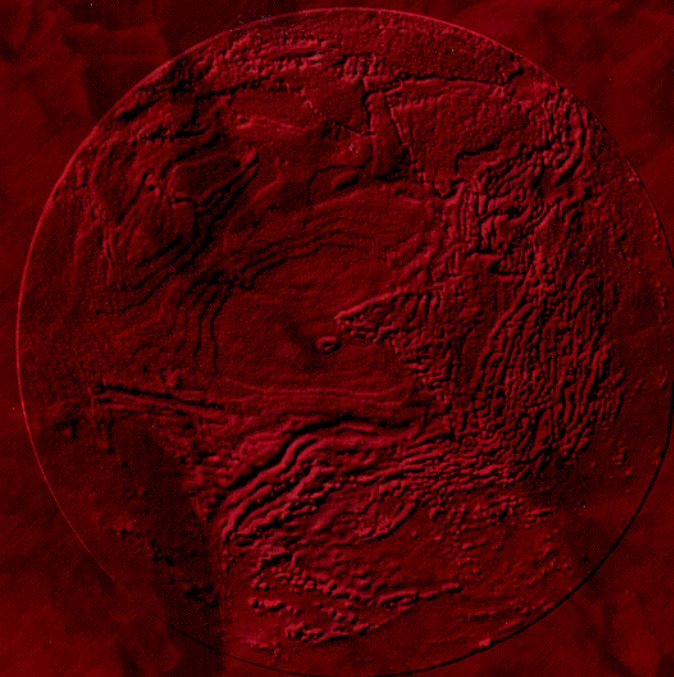
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HANDBOOK OF SEISMIC PROPERTIES OF MINERALS, ROCKS AND ORES



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HANDBOOK OF MINERALS, ROCKS AND ORES SEISMIC PROPERTIES

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Readership: Professionals and academics in the Earth sciences, petroleum and mining industry and geotechnical, mechanical and structural engineering and anyone interested in physical properties of natural materials and in elasticity of solids.

Need: During the past three decades, our knowledge of the seismic properties of minerals, rocks and ores has grown enormously, spurred by the determination of the structures and evolution of the Earth using innovative seismologic technologies (e.g., reflection profiling, tomography, shear-wave splitting), the mitigation of geological hazards (e.g., earthquakes and volcanic activity), and the exploration of mineral deposits, water and energy resources. This handbook provides engineers and scientists with a convenient, compact, authoritative, up-to-date and systematic compilation of the measured seismic properties of Earth materials. It contains almost all the reliable data of P and S wave velocities and anisotropy of various rocks, minerals and ores as functions of pressure and temperature, available in the literature published in English and French. It is much more comprehensive than any previous compilations.

Subject: The handbook is divided into two parts. The first part addresses the single crystal elasticity and seismic properties of 53 common rock-forming minerals, and the overall elastic moduli of their polycrystalline aggregates. This part begins with a simple introduction of the principles and methods for calculating the seismic properties of monophase and polyphase aggregates from single-crystal elasticity data. The second part deals with P- and S-wave velocities and anisotropy of various rocks, ores and mineral aggregates as functions of pressure,

temperature, and propagation and vibration directions. Also given are: geographic location, tectonic setting, lithology, original sample number, density, porosity, humidity (dry or wet), and source literature for each sample. Two tables also summarize chemical and mineral modal compositions of the samples whose seismic velocities and anisotropy have been measured. Finally, it presents the relationship between seismic velocities (Vp and Vs) and density, seismic anisotropy and the mean Poisson's ratio of each main lithologic category, and the effects of phase transformation on seismic properties.

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