

# Application of ultrasonic measurements to determination of the orientation to crystalline samples

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The determination of the orientation of single crystals has been normally done by X-ray diffraction or other methods, e.g. optical. However, there are situations where these methods are not accessible, therefore it is sometimes useful to use ultrasonics as a means for the determination of the orientation [1,2].

The orientation of a single crystalline sample is known when the relation between the laboratory and crystallographic systems is established. Usually the orientation is characterized by the Euler angles.

A method of determination of the Euler angles from the results of measurements of bulk sound (phase) velocities is proposed. It is proven that for this purpose it is necessary to look for waves propagating in three non-equivalent crystalline directions. The proposed method combined with the experimental immersion technique [3] can be a useful tool.

[1] D.Y. Chung, V. Konecny, *phys. Stat. Sol. (a)* **52**, 29, 1976.

[2] A.G. Every, *Phys. Rev. B* **22**, 1746, 1980.

[3] B.E. Read, G.D. Dean, *The Determination of the Dynamic Properties of Polymers and Composites*, Adam Higler, Bristol, 1978.