1057-74-320 **Chi-Sing Man*** (mclxyh@ms.uky.edu), Department of Mathematics, University of Kentucky, 715 Patterson Office Tower, Lexington, KY 40506-0027, and **Mojia Huang**, Institute for Advanced Study, Nanchang University, Nanchang, Jiangxi 330031, Peoples Rep of China. *Irreducible Tensor Bases of the Rotation Group and Material Tensors of Weakly-Textured Polycrystalline Materials.*

Polycrystalline materials usually carry crystallographic texture whose effect on mechanical properties often cannot be ignored. When the mechanical property in question is determined by one or by a set of material tensors (e.g., the elasticity tensor, the acoustoelastic tensor, tensors that appear as terms in plastic potentials and yield functions, etc.), the problem reduces to that of determining effects of crystallographic texture on material tensors. In this paper a group-theoretic method is developed by which explicit expressions that delineate the effects of crystallographic texture on material tensors of weakly-textured polycrystalline materials can be derived systematically. A representation theorem is proved which reduces the problem to that of finding irreducible tensor bases of the rotation group. A method by which irreducible tensor bases can be generated for a given tensor space is outlined. Specific instances important for applications in acoustoelasticity and plasticity are presented as examples. (Received January 25, 2010)