

1. Record Nr.	UNINA9910346888203321
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Titolo	Homogenization of the Linear and Non-linear Mechanical Behavior of Polycrystals
Pubbl/distr/stampa	KIT Scientific Publishing, 2013
ISBN	1000032289
Descrizione fisica	1 online resource (IX, 192 p. p.)
Collana	Schriftenreihe Kontinuumsmechanik im Maschinenbau / Karlsruher Institut für Technologie, Institut für Technische Mechanik - Bereich Kontinuumsmechanik
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Sommario/riassunto	This work is dedicated to the numerically efficient simulation of the material response of polycrystalline aggregates. Therefore, crystal plasticity is combined with a new non-linear homogenization scheme, which is based on piecewise constant stress polarizations with respect to a homogeneous reference medium and corresponds to a generalization of the Hashin-Shtrikman scheme. This mean field approach accounts for the one- and two-point statistics of the microstructure.