



Constrained Deformation of Materials: Devices, Heterogeneous Structures and Thermo-Mechanical Modeling

By Y.-L. Shen

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"Constrained Deformation of Materials: Devices, Heterogeneous Structures and Thermo-Mechanical Modeling" is an in-depth look at the mechanical analyses and modeling of advanced small-scale structures and heterogeneous material systems. Mechanical deformations in thin films and miniaturized materials, commonly found in microelectronic devices and packages, MEMS, nanostructures and composite and multi-phase materials, are heavily influenced by the external or internal physical confinement. A continuum mechanics-based approach is used, together with discussions on micro-mechanisms, to treat the subject in a systematic manner under the unified theme. Readers will find valuable information on the proper application of thermo-mechanics in numerical modeling as well as in the interpretation and prediction of physical material behavior, along with many case studies. Additionally, particular attention is paid to practical engineering relevance. Thus real-life reliability issues are discussed in detail to serve the needs of researchers and engineers alike.

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Editorial Review

From the Back Cover

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About the Author

Yu-Lin Shen is currently Professor and Interim Chair in the Department of Mechanical Engineering at University of New Mexico. He received his Ph.D. in engineering from Brown University in 1994, and was a post-doctoral research associate at Massachusetts Institute of Technology before joining the faculty of University of New Mexico in 1996. Professor Shen is widely recognized for his research in mechanical behavior of materials, especially in modeling. His numerical modeling experience spans disparate length scales from the continuum level down to atomistics, focusing on mechanical issues related to thin films, composite materials and microelectronic devices and packages. He has published over 140 research papers in these areas, mostly in international journals. In 2005 Professor Shen was elected Fellow of the American Society of Mechanical Engineers (ASME).

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