MRS BULLETIN

February 1999

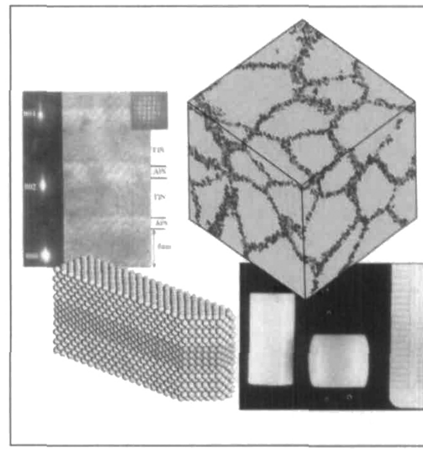
A Publication of the Materials Research Society
Volume 24, Number 2 ISSN: 0883-7694 CODEN: MRSBEA

MECHANICAL BEHAVIOR OF NANOSTRUCTURED MATERIALS

MRS NEWS

ABSTRACTS

DEPARTMENTS



ON THE COVER: (Top Left) High-resolution transmission electron micrograph of an AlN/TiN superlattice with a bilayer period of 6.8 nm and AlN layer thickness of ~1.7 nm. The cubic symmetry is apparent throughout the superlattice indicating the metastable cubic phase of AlN. Insets show selected area diffraction pattern and magnified region. See article on page 20.

(Top Right) Computer-generated nanophase Cu: yellow atoms are atoms with fcc local crystalline order, green and blue atoms are grain boundary atoms with non-fcc local crystalline order (green: 12-coordinated, blue: non-12-coordinated). (Courtesy of H. Van Swygenhoven, Paul Scherrer Institut, Switzerland.)

(Bottom Left) A computer-generated model of a copper interlayer (red atoms) sandwiched between two (very thick) layers of silver. Copper, which is normally fcc, adopts a bcc crystal structure as a stable configuration with its {110} planes parallel to the sides of the model. The stability of this arrangement is due to a remarkable coincidence that the length of a face diagonal of bcc Cu is almost exactly equal to the lattice parameter of Ag. Consequently, a {100} face of Ag acts as a template for constructing the bcc phase of Cu. A corner of the model has been sliced off to reveal a {110} plane of Ag and a {100} plane of Cu. More information on metastable phases will be found on page 20. (Courtesy of R.G. Hoagland, Washington State University.)

(Bottom Right) Photo showing a sample before and after superplastic deformation in nanocrystalline zirconia. See the article on page 44.

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MRS Bulletin (ISSN: 0883-7694) is published 12 times a year by the Materials Research Society, 506 Keystone Drive, Warrendale, PA 15086-7573. Periodical postage paid at Warrendale, PA and at additional mailing offices. POSTMASTER: Send address changes to *MRS Bulletin* in care of the Materials Research Society, at the address listed; phone 724-779-3003; fax 724-779-8313. Printed in the U.S.A.

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Editorial Office • 506 Keystone Drive • Warrendale, PA 15086-7573 USA
Tel. 724-779-3004 ext. 522; fax 724-779-8313; http://www.mrs.org/

https://doi.org/10.1557/S0883769400051411 Published online by Cambridge University Press