K. LINGA MURTY
ANS MISHIMA AWARD - CITATION
(June 1993)

Dr. K. Linga (KL) Murty, a professor at NCSU in the Department of Nuclear Engineering (and jointly with Materials Engineering) is the recipient of the American Nuclear Society (ANS) Mishima Award for contributions to nuclear materials and fuels research and development, and the award will be presented during the ANS Annual Meeting in San Diego next month (June 22, 1993). Prof. Murty is cited for outstanding contributions in understanding the deformation, creep and formability of hcp metals, Zr, Ti, Mg and their alloys; in the application of textures in predicting in-reactor cladding performance; in understanding radiation effects on the fracture behavior of nuclear structural alloys and synergistic effects of radiation-induced defects and impurities.

NOMINATION STATEMENT FOR DR. K. LINGA MURTY

Dr. Murty is nominated for Mishima Award for his significant contributions in the understanding of the deformation, creep and formability of textured hexagonal close packed (hcp) metals such as Zr, Ti, Mg and their alloys; the application of textures in predicting the nuclear fuel cladding performance in-reactor; and the understanding of radiation effects on the mechanical and fracture behavior of nuclear materials (Zirconium alloys, nuclear pressure vessel steels, reactor support steels, radioactive waste tanks); and synergistic effects of radiation-induced defects and impurities.

- provided first capability of predicting deformation, creep and formability of Zircalloys from crystallographic textures using COUF (Nucl Tech '87; ASTM STP 1023 '88; Materials Forum '91) which facilitated prediction of cladding performance (dimensional changes) in reactor. Extensions of these studies to thick-walled tubing (TREX) and thin sheets were of direct utility to manufacturers of the reactor cladding, intermediate grids, channels for BWRs, calandria tubes for CANDUs in choosing zirconium alloys with optimum textures for good formability.
- pioneering research in proposing and detecting the beneficial effect of neutron irradiation on the mechanical and fracture characteristics of ferritic steels in the Blue-Britle or DSA regime (Nature '84; Met Trans '88). It was the first time anyone noticed these effects and many editorials appeared on this work including those in Science News, New Scientist, Nuclear Engineering International, etc. These findings have significant bearing on the radiation embrittlement of reactor support steels exposed to low energy neutrons at low temperatures and in life extension of the operating reactors.
- development and successful use of new techniques, such as biaxial creep testing, impression testing for mechanical anisotropy of thick-walled tubing and grid technique for thin sheets, elastic-plastic fracture toughness (Jlc) of steels and titanium alloys using small size samples and radiation effects.
- application and utilization of nondestructive and noninvasive techniques such as pulse NMR to investigate the dynamical behaviors of point and line defects in materials (alkali halides and metals) in-situ during deformation (Phys Rev. '91, MRS 90) with possible extension to radiation-enhanced diffusion.
- demonstrated the significance of transitions in creep and deformation mechanisms of structural metals on reliable life prediction of power (including nuclear) plant equipment (DoE '92, DOE '92 workshop on the life prediction of power systems).
- application of fundamental deformation mechanisms and mechanism maps to mechanical reliability of electronic solders in microelectronic multichip packages (ASME '92, NEPCON-93)

Prof. Murty served as co-editor of •Tribological Mechanisms and Wear Problems in Materials, ASM (1987), and • Microstructures and Mechanical Properties of Aging Materials, ASM (1993), in print. He has organized numerous symposia in these various research areas and chaired technical sessions.