

# Study of Metal-ceramic Interactions at Elevated Temperatures 1952 Frederick Harwood Norton, W. D. Kingery Technical Information Service, 1952

High-temperature metallurgical reactions involving molten phases are often carried out under the conditions of near equilibria among all the phases; other such reactions proceed under the control of interphase mass transfer with equilibria at interphase boundaries. Reactions involving gas-solid contact also often take place under the rate control of mass transfer with chemical equilibrium at the interface, but the chemical kinetics of the heterogeneous reactions are more often important in this case than those involving molten phases. The glass transition temperature is, for a noncrystalline ceramic, that temperature at which there is a change of slope for the specific volume versus temperature curve. The melting temperature is, for a crystalline material, that temperature at which there is a sudden and discontinuous decrease in the specific volume versus temperature curve. Mechanical properties. Mechanical properties: brittle fracture. In solids with ionic-type bonds, slip (dislocation motion) is difficult because ions of like charge must be brought into close proximity which forms a large barrier for dislocation motion. Elevated T creep properties are generally superior to those of metals (and polymers). Taxonomy of ceramics. Properties Request PDF | Fundamental studies of ceramic/metal interfacial reactions at elevated temperatures. | This work characterizes the interfaces resulting from exposing oxide and non-oxide ceramic substrates to zirconium metal and stainless steel. Find, read and cite all the research you need on ResearchGate. It was observed that the Zr is very active in the wetting of nitride ceramics at elevated temperatures. This interaction began at high temperatures before Zr melting, and a reactive transition phase formed between the ceramic and the metal. This strongly bonded layer is dense, continuous and appears to be some form of zirconium nitride. Read more. The ceramic industry embraces a wide field of various types of operation, most of which depend upon high temperatures and utilize metals. Each field is highly specialized and, although workers in the various fields have collected information on the requirements for and uses of metals at elevated temperatures, little has been published. The author has, of necessity, gone to the specialists in these fields for his information and this paper represents more a study of their contributions than results of his own experience. Author Information: Williams, Clyde E. Assistant Director, Battelle Memorial Institute