

LOW THERMAL CONDUCTIVITY OXIDES

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There are several important energy-related applications that could benefit from the identification of oxides that have low thermal conductivity at high temperatures and can withstand prolonged exposure at high temperatures. The classic example is yttria-stabilized zirconia, the current oxide of choice for thermal barrier coating applications, which has a high temperature conductivity of ~ 2 W/mK. In searching for oxides with still lower thermal conductivity there are some general guidelines provided by existing lattice models of thermal conductivity but these are insufficient to predict the conductivity of multi-component or oxides with complex crystal structures and multiple ions in solution. In this presentation I will describe recent developments in the search for low thermal conductivity oxides and the strategies we are using to identify oxides with unusually low thermal conductivity at high temperatures.