Even glass corrodes in contact with water

Stéphane Gin

CEA, DES, ISEC, DPME, University of Montpellier, Marcoule, F-30207 Bagnols sur Cèze, France

**E-Mail: stephane.gin@cea.fr*

Abstract

Glass is often presented as a material with high resistance to alteration by water. Yes, but if it is asked to resist 500,000 years to confine radioactive waste, it really has to be extremely resistant. Conversely, if glass or rock wool is to be manufactured, the glass must be rapidly soluble in the pulmonary fluids so that it is not harmful. In reality, durability is a matter of material composition and environmental conditions. So here we are, immersed in the science of glass alteration! The presentation traces 25 years of research to better understand the mechanisms involved, their effect on the rate of weathering and the development of models from the atomic scale to the macroscopic scale to predict the behavior of these materials in a wide range of conditions. From ab initio calculations to observations of archaeological analogues to heated debates over the formation of alteration layers, we will discuss the advances made since the pioneering work of Bunker, Grambow or Vernaz in the 1980s. This story is not yet finished, but it is marked by great scientific and human adventures.