Probing Nanostructures in Steel Alloys

The designers of nuclear fission reactors would like to use steel that can last longer in the high temperatures and radiation produced in the crucible of nuclear reactions. Scientists know that yttrium, titanium, and oxygen within a steel alloy can form nanoscale features that make the metal less susceptible to cracking and weakening, but the details of those features are not well understood. Now researchers have used the APS to better understand how oxide nanostructures form in steel alloys, which could lead to the creation of even more durable steel. >

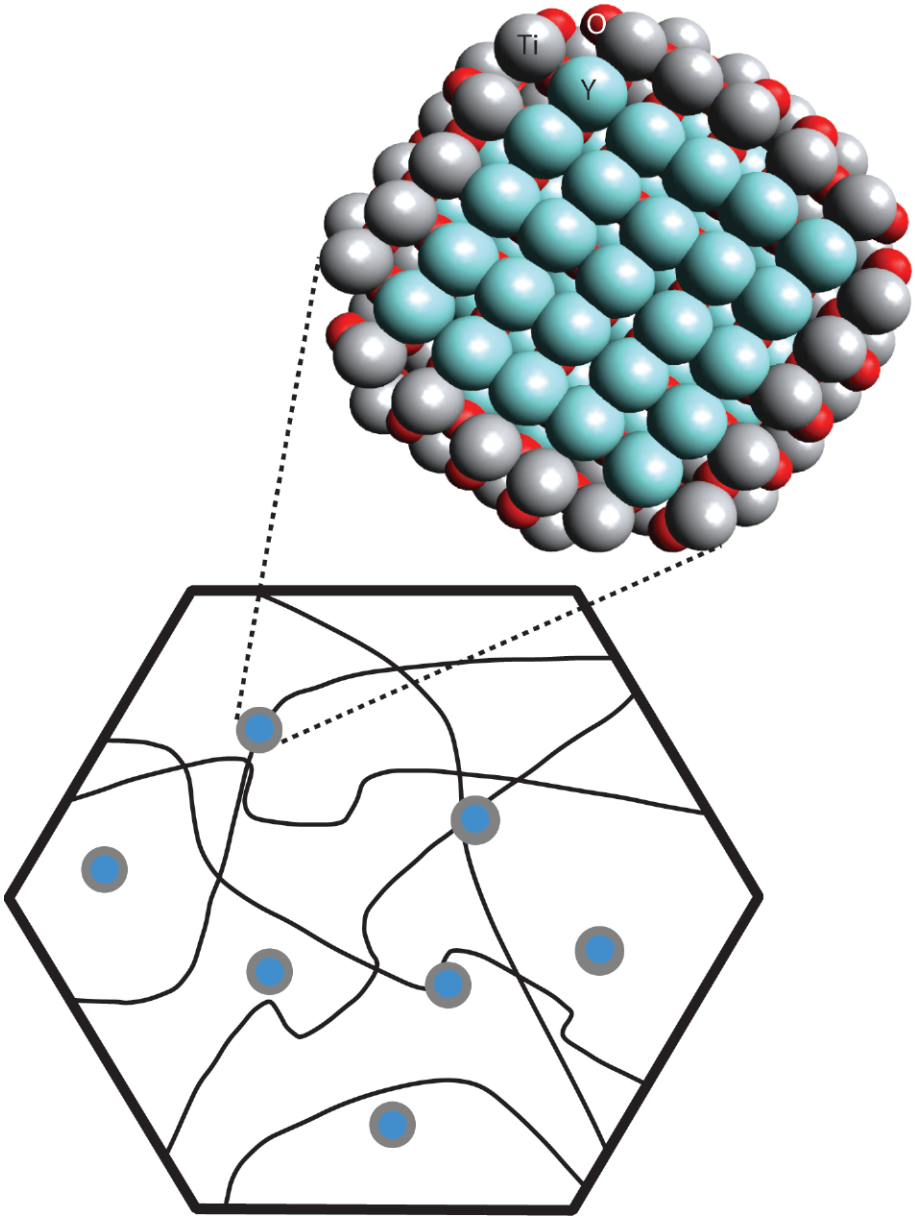

Fig. 1. A schematic representation of bulk steel shows grain boundaries (black lines) and nanofeatures (circles). The researchers in this study postulate that the nanofeatures' structure (above) consists mainly of yttrium oxide surrounded by titanium oxide (blue=yttrium, gray=titanium, red=oxygen).