

Project Id	15
Project Title	Analysis of Debris Dissolution in Metallic Orthopedic Implants
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Additional Faculty	
Faculty Department	Materials Engineering
Project Description	<p>Each year, 250,000 people in the United States receive hip replacements. Normally these devices consist of a metal femoral head (or ball) and a polymeric cup. Increasingly, however, doctors are opting to use a metal head and a metal cup. These newer designs provide better long-term performance, especially for younger more active patients. The difficulty however, is that even these more robust systems suffer some wear damage. This damage releases small amounts of metallic particles into the patient's body. Over time, these particles begin to break down, or dissolve, due to corrosion into individual metallic ions. These ions then have the ability to be transported throughout the body. Research has shown that patients with these devices implanted in their bodies have elevated levels of cobalt and chromium ions in their blood, urine, and some soft tissue organs such as the liver. Since no one knows how these ions will affect the patient's long-term health, there is great interest in understanding how these ions are formed and how they are transported.</p> <p>In this project, the student will work on developing methods to measure the dissolution rate of small metallic particles. This may include both morphological and chemical methods. First, the student would be involved in characterizing the size, shape, and number of particles present before and after corrosion testing. Second, they would assist other researchers with chemical analysis of ion levels in serum used during corrosion testing. By synthesizing this data together, we should develop a reasonable approximation of the rate at which these particles are dissolving.</p>
Interdisciplinary Nature Description	
Links	
Number of Honors Students Requested	2
Applicable Majors	CHEM, Engineering
desired_res	
Date Added	2008-10-27 11:30:46
Active	1