

### **Advanced Materials (Ramot)**

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[Noam ELIAZ](#), T.A.U Tel Aviv University, Engineering, Materials Science & Engineering Program

### **The Biomaterials and Corrosion Laboratory**

Iby and Aladar Fleischman Faculty of Engineering, Tel-Aviv University, Israel

In line with the demands of modern society, the multidisciplinary Biomaterials and Corrosion Laboratory is conducting strategic R&D on advanced materials ranging from biomaterials and nanomaterials, to materials for space applications, alloy deposition and archaeology. The Lab also provides materials selection, quality control and failure analysis services, serving and collaborating with industrial, medical and defense organizations. Among the lab's internationally renowned achievements are:

- The development of novel electrochemically-deposited hydroxyapatite (HAp) coatings for orthopedic and dental implants. Coatings prepared in the lab have demonstrated higher performance than the commercial plasma-sprayed coatings.
- The development of hybrid nano-composites with unique mechanical and electrical properties and improved durability in space, for example, with higher resistance to space debris collisions and to attack by atomic oxygen. The project is conducted in collaboration with the Space Environment Group at Soreq NRC.
- The magnetic isolation of bone, cartilage and synthetic material particles from synovial fluids for diagnosing osteoarthritis and for monitoring the wear of artificial joints. The lab is the only one outside the US to have this capability (by means of Bio-Ferrography).
- The electroplating of W-Ni and Re-based alloys, as well as the electroless deposition of Re-based alloys. These projects are conducted in collaboration with Prof. Eliezer Gileadi from the TAU School of Chemistry, and are intended for aircraft, aerospace, nuclear, chemical, electrical, biomedical and other applications.
- The development per industry request of a novel electropolishing process for miniature implants (e.g. stents and heart valves) made of stainless steel.

### **Professor Noam Eliaz - Head of the Lab**

A professor of mechanical engineering at the Fleischman Faculty of Engineering, Prof. Eliaz gained his BSc and PhD degrees in materials engineering and an MBA from Ben-Gurion University, all cum laude. He worked for three years at the Department of Materials and Failure Analysis at the Israel Air Force after completing his undergraduate degree, and then for two years at the H.H. Uhlig Corrosion Laboratory at M.I.T after completing his doctorate. He is the founder of the TAU Biomaterials and Corrosion Laboratory, which has become the largest lab of its kind in Israel and attracts many top-notch graduate students.

Prof. Eliaz's numerous publications are widely cited, and he has frequently been invited to deliver presentations at national and international scientific conferences. He has been a member of many national and international committees and associations, including Chief Editor of the journal Corrosion Reviews, Chairman of the Israel Section of NACE International, Chairman of Central Committee 300 for Chemistry Standards at the Standards Institution of Israel and Chairman of the 14th Israel Materials Engineering Conference.

A Faculty Coordinator of the Materials Science and Engineering Program, Prof. Eliaz has garnered numerous accolades, including the Fulbright and Rothschild postdoctoral fellowships (the first materials scientist to receive both simultaneously), Israel Ministry of Science's Eshkol Scholarship for Scientific Infrastructures, Dan David Scholarship, and the T.P. Hoar Award for the best paper


published in Corrosion Science.

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