

LOOKING BACK, MOVING FORWARD ON SAFARI IN MATERIALS WITH GUN AND CAMERA

Richard W. Siegel

*Materials Science and Engineering Rensselaer Polytechnic Institute,
Troy, New York, USA*

Electron microscopes, with their electron gun at one end and their recording camera at the other, were used to investigate a variety of materials in my research over the past six decades, complemented by a parallel use of a number of macroscopic measurements. This intimate combined use of macro- and microscopic methods enabled research spanning from vacancy precipitation in metals to the synthesis, structures, and properties of nanomaterials from ceramics, metals, and polymer nanocomposites, to biomaterials. In 1989, with the newly developing scientific field of nanomaterials still in its infancy, it seemed like a good, if rather bold, time to create the first dedicated commercial venture to manufacture and distribute nanophase materials to the public. Not that the public was yet interested or really aware of these materials, nor were we really yet able to scale up our laboratory process for creating these materials in commercially viable quantities, but we founded a company anyway, which went public in 1997 and is still growing today. Over the intervening 33 years, there have been challenges large and small with some successes and rewarding experiences, leading to commercial activities in several areas: active materials for personal care, including sunscreen ingredients and fully formulated cosmetics; and other advanced nanomaterials for medical diagnostics, architectural and industrial coatings, abrasion-resistant plastics, and surface finishing. A brief reminiscence of these research and commercialization experiences will be presented with examples from the past along with some of the lessons learned, especially those that might prove potentially useful for young researchers. high-quality parts of large dimensions on the way to industrial production.