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Incorporating Nanomaterials into a New Ceramics Textbook

M. Grant Norton^{(1)*} and C. Barry Carter⁽²⁾

(1) School of Mechanical and Materials Engineering, Washington State University, Pullman WA 99164, USA; mg_norton@wsu.edu.

(2) Department of Chemical, Materials, and Biomolecular Engineering, University of Connecticut, Storrs CT 06269, USA; cbcarter@engr.uconn.edu.

* Corresponding author.

Abstract – In this presentation I will describe how we have incorporated nanomaterials into a textbook on ceramics designed for use in a senior-level undergraduate/graduate ceramics course. I will illustrate the pedagogical approach we have adopted to deal with a new, emerging, and rapidly expanding field. Although the presentation will specifically focus on ceramics the approach is suitable to a number of different materials classes and themes.

One of the challenges with incorporating nanomaterials into the traditional materials science and engineering (MS&E) curriculum is how to do it without: Adding extra credit hours (generally unpopular with students), omitting the fundamentals (generally unpopular with faculty), or adding extra courses (generally unpopular with administrators). Thus, the approach that is most commonly adopted is to integrate topics on nanomaterials/nanotechnology within the framework of an existing course or courses. In this way it is possible to create a curriculum that is infused throughout with “nano”. Even though many faculty are now teaching courses that include some discussion of nanomaterials (e.g., their synthesis or properties) there are very few materials science textbooks that address topics related to nanomaterials within the context of the broader fundamentals, which themselves remain important. In this presentation I will describe how we have incorporated nanomaterials into a new textbook on ceramics [1]. This textbook provides a completely new and updated approach to the teaching of a subject that has its roots in the earliest human history. I will show specific examples of how and where nanomaterials can be integrated with the “ceramics” theme and what specific topics can be covered, i.e., ones where there is sufficient understanding and ones that are likely to excite or inspire students to continue their study of ceramics (one of our ultimate goals).

References

[1] C.B. Carter and M.G. Norton, ‘Ceramic Materials: Science and Engineering’ Springer, New York (2007).