**4.1 Development of Micro-Engineered Textured Tungsten Coatings for High Heat Flux Applications** — S. Sharafat[1], A. Aoyama[1], B. Williams[2], and N. Ghoniem[1], ([1]University of California, Los Angles, [2]Ultramet Inc.)

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Thermo-mechanical performance of plasma facing components (PFCs) can be enhanced by micro-engineering the surface. For example, castellation of a surface can reduce thermal stress due to high heat loads and thus provide higher thermo-mechanical resilience. Recently, fabrication of a variety of micro-sized refractory dendrites with reproducible geometric characteristics, such as density, height, and aspect ratio has been demonstrated. Compared to a flat surface exposed to high heat loads, the ability of dendrites to deform independently minimizes near-surface thermal stress, resulting in improved thermo-mechanical performance. Thus, the use of dendrites offers a unique micro-engineering approach to enhance the performance of PFC structures. A brief overview of W, Re, and Mo dendritic structures is given along with micrographs which show dendrite coated surfaces. The thermal responses of representative dendrite structures were analyzed as a function of aspect ratios and dendrite geometry. The heat management capability of needle-like dendrites exposed to a surface energy of up to 1 MJ/m2 was analyzed and compared to a flat surface. It is found that dendrite structures can significantly reduce thermal stress in the substrate when compared to flat surfaces. Implications of dendritic surface features on sputter erosion rates are also discussed briefly.