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# Editorial

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Nanocrystalline materials have been attracting a lot of attention in recent years from scientists working in different fields, such as materials science and engineering, physics, chemistry, biology, and mechanical engineering. These materials, with grain sizes of typically <100 nm, exhibit an interesting combination of physical, chemical, and mechanical properties. Despite the fact that intensive research investigations are being conducted to understand the behavior and properties of these materials, there are still gaps in our understanding. One such area, where the gap in understanding is wide, is the mechanical properties of nanostructured materials. Traditional wisdom tells us that these materials with small grain sizes should exhibit extremely high strength and, consequently, they should be brittle. But, through innovative means, scientists have been trying to develop materials that are strong and at the same time ductile. Some limited success has been achieved in this direction.

There have also been significant improvements in the processing and consolidation of nanocrystalline materials. With these it has been possible to obtain samples that are fully dense and defect free, allowing scientists to come closer to studying the intrinsic behavior of nanocrystalline materials rather than the flaw-dependent failure that masked the true mechanical behavior, particularly in tension.

Large-scale manufacturing and wide-spread applications for these novel materials can reduce the cost of production and thus lead to applications in further and diversified areas. With these points in mind, an *International Symposium on Manufacturing, Properties, and Applications* was organized during October 18-20, 2004 in Columbus, OH, as part of the ASM International Materials Solutions Conference and Exposition.

This special issue of the *Journal of Materials Engineering and Performance* (JMEP) contains some selected papers that were presented at the Symposium. We are thankful to the authors for submitting their interesting work for publication. These papers went through a rigorous peer-review process. We are thankful to the reviewers, who by convention should remain anonymous, for taking time to review the manuscripts despite their busy schedules.

We are most grateful to ASM International for allowing us to be part of their national initiative on Nanomaterials Technology and in encouraging us to organize this Symposium. We also thank Dr. Jeffrey Hawk, Editor, and the staff of JMEP for putting together this Special Issue.

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