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Editorial

One commonly divides materials into three classes: metals, ceramics and polymers. The common definition of ceramics is "non-metallic, inorganic materials". This describes what ceramics are not, rather than what they are. Indeed, even this definition has become outdated given that many oxides, carbides and nitrides exhibit metallic levels of conductivity. Moreover, superconducting materials with the highest critical temperatures are now well known to be copper-based oxides. The question then arises when is a material a metal and when is it a ceramic? In a similar vein, would scientists and engineers working in silicon-based technology view themselves as ceramists? Obviously, silicon is non-metallic and inorganic, but somehow silicon and the common III-V compounds such as GaAs are treated as some other class of materials.

My former colleague, Prof. David Kingery, known by many as the father of modern ceramics, provided an effective working definition: "Ceramics are those materials with which ceramists wish to work". Well modern ceramists—often better known as materials scientists—are certainly working with a much broader and more exotic range of materials than ever before, thereby expanding the commonly accepted bounds of ceramics. This becomes particularly true in our field of Electroceramics where the electrical, optical and/or magnetic properties of materials of interest to our community often blur with those studied and utilized by others in the electronics industry. Consider the growing requirement for materials with ever increasing band gaps by the electronics industry. For electronics, large band gap semiconductors provide the opportunity to operate to higher temperatures and at higher power levels. For photonics, larger band gaps enable the production of light emitting diodes, injection lasers and detectors which operate in the blue-green and UV regions of the spectrum. Major progress along these lines has been achieved in recent years with the development of devices based on materials from the InN-GaN-AlN solid solution system. On the one hand, these materials can be viewed as a natural extension of work in the semiconductor field on the well known InAs-GaAs-AlAs system. On the other hand, much work has been performed on AlN by the ceramics community as a high thermal conductivity substrate and as a piezoelectric material.

The nitrides are inorganic and nonmetallic, refractory, interesting to work with and possess important electrical and optical properties. As such, they readily satisfy all the criteria as required to fall within the bounds of Electroceramics. I look forward to seeing work related to these materials in coming issues of our journal and to insure this, I have invited a world authority in this field, Prof. Theodore Moustakas of Boston University to prepare a feature article on nitrides for the coming year. We encourage others to follow suit.

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