

# Novel Carbonitrides of Silicon and Boron and Related Compounds

Ralf Hauser and Ralf RIEDEL

Institute of Materials Science, Darmstadt University of Technology, Petersenstr. 23, D-64287 Darmstadt, Germany,

email: [Hauser@materials.tu-darmstadt.de](mailto:Hauser@materials.tu-darmstadt.de); [riedel@materials.tu-darmstadt.de](mailto:riedel@materials.tu-darmstadt.de);

[www.tu-darmstadt.de/fb/ms/fg/df/welcome.html](http://www.tu-darmstadt.de/fb/ms/fg/df/welcome.html)

There is presently much effort in basic science and applied research to work on novel materials with properties far beyond that of the existing ones [1,2]. Aim and scope of the research in this field is to develop materials with superior thermomechanical, physical and chemical properties. In particular, the synthesis of carbonitride and borocarbonitride based ceramic devices from molecular inorganic polymers has attracted increasing attention for the production of dense and porous ceramic composites, fibers or coatings. One important advantage of polymer derived ceramics is their potentially simple processing to complex components by extrusion or injection molding of polymer masses or by cold machining of compacted polymer parts. Moreover, novel ceramic compositions such as ternary or quaternary silicon based carbonitrides and borocarbonitride can be synthesized by the polymer-to-ceramic transformation route. Silicon containing carbonitrides have been found to be extremely high temperature resistant with respect to crystallization, decomposition, creep, and oxidation.. In this presentation, the progress in synthesis and processing of molecular preceramic compounds as well as some properties of the novel ceramic materials derived therefrom are reviewed.

## References

- [1] E. Kroke, Y.-L. Li, C. Konetschny, E. Lecomte, C. Fasel, R. Riedel, „Review-Article: „Silazane-Derived Ceramics and Related Materials“, Materials Science & Engineering R **26** (2000) 97
- [2] R. Raj, R. Riedel, G.D. Soraru, "Introduction to the Special Topical Issue on Ultrahigh-Temperature Polymer-Derived Ceramics", J. Am. Ceram. Soc. **84(10)** (2001) 2158-2159.