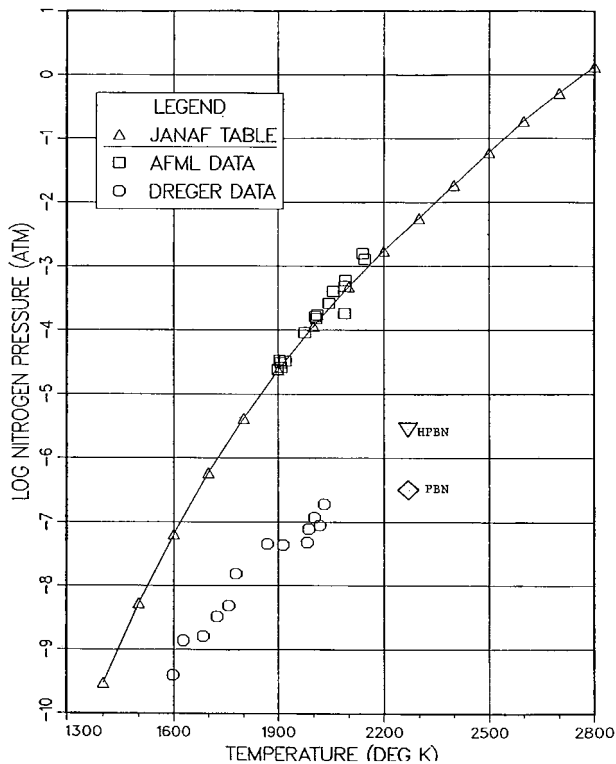


## Vacuum stability and out gassing of PG/PBN heaters

PBN and PG materials themselves are fully dense ceramics, so there are no trapped gases. Even graphite core heaters have shown excellent stability in ultra high vacuum environments. Graphite core heaters have been processed at well over 1500 °C, in a vacuum, and sealed with CVD coatings of PBN and PG.

It has been demonstrated that a heater can be driven above the N<sub>2</sub> vapor pressure curve, in which case the boron nitride can dissociate. This is a temperature – pressure dependent relationship and is seen only in rare circumstances. Anecdotal evidence from customers indicates the JANAF and AMFL data in the following graph is applicable. Thus, for most practical heater limits of about 1100 °C, 1370 °K, the vapor pressure is about 3x10<sup>-10</sup> atm., or 8x10<sup>-8</sup> mm.

NITROGEN PRESSURE OVER BORON NITRIDE



The vapor pressure curve is printed from "Characterization of PBN for Semiconductor Materials Processing", Journal of Crystal Growth 106 (1990) 6-15, by A.W. Moore.

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