BARC develops Titanium Diboride Ceramics

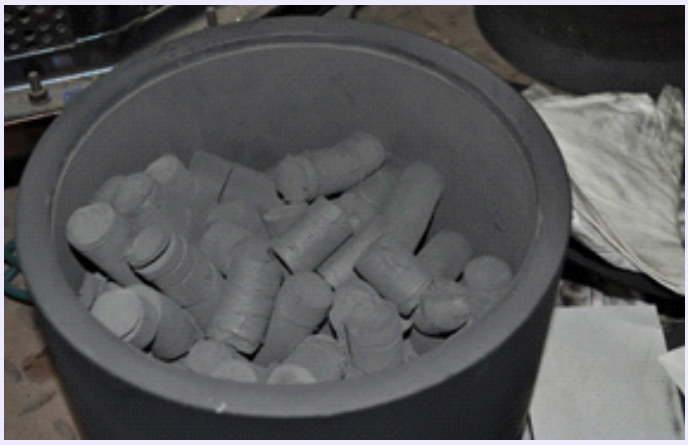
Materials Group, BARC

The technology for synthesis and densification of Titanium diboride (TiB_2) based ultra-high temperature ceramics, with potential applications in development of body armours, high-end cutting tools, molten metal crucibles and wear-resistant-parts was developed in-house by Materials Processing and Corrosion Engineering Division, Materials Group, BARC. $TiB_2$is gifted with attractive properties such as high melting temperature, high hardness, good thermal conductivity and chemical inertness. The technology was transferred to a Gujarat-based firm for industry-scale production.

TiB_2 ceramics: From powder form to densified shapes

(i) Synthesizing of phase pure TiB_2 powder by carbothermic reduction of titanium oxide in the presence of boron carbide.

(ii) Densification of TiB_2 powder into high dense pellets by hot pressing at 1800°C in high vacuum at a pressure of 32 Mpa.



TiB_2chunks (Top) Flat dense shapes of TiB_2 (Bottom)