## VALUE ADDED ABSTRACT

## Microstructure and Properties of in situ Transformed carbon fibre toughed Alumina Composite

## Huahui Chen

. Hereby, pre-oxidized polyacrylonitrile (PAN) fibers as a precursor of carbon fibers, and the PAN fibers would be in situ transformed into carbon fibers and homogeneously distributed in the alumina matrix by controlled sintering process. The novel process made that carbon fiber reduces not only the damage of carbon fibers, but also simplifies the composite preparation process and improves interface bonding. The phase structure of the in situ transformed carbon fibers, the interface and the microstructure of the composite were analyzed by XRD, SEM and TEM. The nanoindentation, hardness, friction and wear properties were measured and anlyzed. The results show that twice grade heating separately at 444°C and 1070°C for 10min and a sintering temperature

A novel process for ceramic matrix composite preparation was proposed of 1700 °C process ensures the formation of in situ carbon fibers. XRD analysis shows that the composite presents a typical diffraction peak at 26.3°, which corresponds to the (002) crystal face of carbon fibers, and the iriterlayer spacing d<sub>002</sub>=0.3425nm. TEM shows that the carbon atoms array in the form of turbostratic graphite platelet along the axile direction formation and composite preparation were synchronously completed. It of carbon fibers, the peel and core structure of the carbon fibre is different. The carbon content of the in situ transformed carbon fibers is 92.68%. The friction coefficient decreases with time both under dry and water lubrication. The in-situ Cf/Al<sub>2</sub>O<sub>3</sub> composite presents a self-lubricated property and excellent wear resistance.

Huahui Chen, Jingjing Cao, Jie Ren China University of Mining and Technology, Beijing 100083, China

Correspondence: Huahui Chen, Jingjing Cao, Jie Ren China University of Mining and Technology, Beijing 100083, China *E-mail:* chh@cumtb.edu.cn

Received: November 28, 2020, Accepted: November 29, 2020, Published: November 30, 2020

ACCESS 6

This open-access article is distributed under the terms of the Creative Commons Attribution Non-Commercial License (CC BY-NC) (http:// creativecommons.org/licenses/by-nc/4.0/), which permits reuse, distribution and reproduction of the article, provided that the original work is properly cited and the reuse is restricted to noncommercial purposes. For commercial reuse, contact reprints@pulsus.com

Huahui Chen Vol. IssueS3 2020