

2<sup>nd</sup> International Conference and Expo on

# Ceramics & Composite Materials

July 25-26, 2016 Berlin, Germany

## Microstructure and mechanical properties of zirconia ceramics consolidated by a novel oscillatory pressure sintering

**Zhipeng Xie**

Tsinghua University, China

Zirconia ceramics with high density and fine, uniform grains were consolidated by a novel oscillatory pressure sintering (OPS) approach. Compared with the zirconia ceramics by hot pressing (HP) at the same sintering temperature, grain sizes of the OPS specimen were distributed in a narrower range with average size of 278 nm; besides, the anisotropic grain growth was inhibited by oscillatory pressure, resulting in a smaller difference between the long radius and the short radius than the HP specimen. Due to microstructure evolution, the flexural strength of the OPS specimen reached approximately 1549 MPa and the load-displacement behaviors were also improved. Such evolutions in microstructure and mechanical performances were ascribed to the new densification mechanisms induced by oscillatory pressure.

[xzp@mail.tsinghua.edu.cn](mailto:xzp@mail.tsinghua.edu.cn)

## Formulation of calcium dialuminate ( $\text{CaO}\cdot 2\text{Al}_2\text{O}_3$ ) refractory cement from local bauxite

**A B Tchamba<sup>1,2,3</sup>, J C Sofack<sup>3</sup>, R Yongue<sup>1</sup> and U C Melo<sup>1,3</sup>**<sup>1</sup>University of Yaounde 1, Cameroon<sup>2</sup>ENSCI, France<sup>3</sup>Local Materials Promotion Authority, Cameroon

Three types of bauxites containing aluminum hydroxide of 58.1% gibbsite and 19.3% boehmite for BX3, 95.5% of gibbsite for BX55 and 84.5% of gibbsite for BX8 were used with lime at 95% of CaO through solid state sintering in one stage to prepare a refractory clinker at 1550°C. The powder obtained after grinding the clinker showed in the XRD curves the presence of  $\text{CaO}\cdot 2\text{Al}_2\text{O}_3$  and  $\text{CaO}\cdot \text{TiO}_2$  phases in the cement samples. The density of cement powder varied between 2.95 and 3.17 g/cm<sup>3</sup> and the specific area of powder obtained after grinding was between 0.72 and 0.85 m<sup>2</sup>/g. The properties of hydrated cement, W/C = 0.33, after stabilization of cement components for 48 h at 105°C were showed by XRD, DTA, DTG and SEM (C3AH6, AH3, CA2 and  $\text{CaO}\cdot \text{TiO}_2$ ). The Young's modulus of the cement made varied between 35.5 and 39.4 GPa, and these Young's moduli were compared to conventional CA14M cement.

[attchamba@yahoo.fr](mailto:attchamba@yahoo.fr)

### Notes: