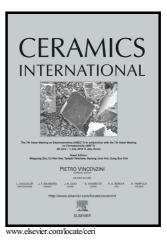
## Author's Accepted Manuscript

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S.I. Talabi, A.P. Luz, A.A. Lucas, C. Pagliosa, V.C. Pandolfelli



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### **ACCEPTED MANUSCRIPT**

#### Catalytic graphitization of novolac resin for refractory applications

S. I. Talabi<sup>(1, 2)\*</sup>, A. P. Luz<sup>(1)</sup>, A. A. Lucas<sup>(1)</sup>, C. Pagliosa<sup>(3)</sup>, V. C. Pandolfelli<sup>(1)</sup>

 <sup>(1)</sup> Federal University of São Carlos, Materials Engineering Department, Rod. Washington Luiz, km 235, São Carlos, SP, 13565-905, Brazil.
 <sup>(2)</sup> University of Ilorin, Materials and Metallurgical Engineering Department, PMB 1515, Ilorin, Kwara State, Nigeria.
 <sup>(3)</sup> RHI-Magnesita, Research and Development Center, Praça Louis Ensch, 240 Contagem, MG, Brazil.

\*Corresponding author at: tel.: +55-16-992986481; fax: +55-16-33615404. E-mail: talabi.si@unilorin.edu.ng

#### Abstract

This study investigated how to induce graphite generation from the carbonization process of novolac resins using conditions that can be adopted for carbon-containing refractories (CCRs) production. The effect of boron oxide or boric acid (graphitizing agents), cross-linking additive (hexamethylenetetramine) and some processing parameters (mixing technique, vacuum degassing, heating rate and thermal treatments) on carbon graphitization from a commercial novolac resin were evaluated. The X-ray diffraction (XRD) technique was selected to measure the graphitization level and crystal parameters of the prepared samples. Based on the attained results, adding graphitizing agents prior to the pyrolysis of resin resulted in carbon crystallization. The best graphitization level was obtained when the mixtures containing 6 wt.%  $B_2O_3$  or 10 wt.%  $H_3BO_3$  were fired up to 1000°C for 5 hours using a heating rate of 3°C/min. Although the reproducibility of the obtained results was ascertained, heterogeneous graphitization could be observed based on the XRD profiles, as well as some discrepancies in the calculated graphitization level values. This phenomenon was

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