# A perspective on non-Stoichiometry in Silicon Carbide

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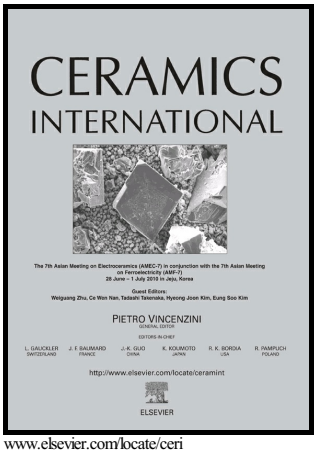


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# A perspective on non-Stoichiometry in Silicon Carbide

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ABSTRACT

The non-stoichiometric ceramics are amazing materials with potential to offer applications that are unachievable by using otherwise ideal stoichiometric counterparts. These materials have contributed in wide areas including superconductivity, optical, magnetic, electronic, structural, mechanical and transport applications. The deviation form stoichiometry in a large number of compounds, though usually avoided, has numerous benefits; by increasing ionic conductivity, offering band structure modifications, causing paramagnetic to ferromagnetic transitions, reducing magnetoresistance, increasing mechanical strength, enhancing electrochemical efficiency etc. Keeping in mind the promising contributions of silicon carbide among family of ceramic materials, this review highlights the implications of non-stoichiometry and its properties. The non-stoichiometry produced unintentionally or purposefully is strongly influenced by synthesis conditions and varies for silicon carbide grown in amorphous, crystalline, polycrystalline polytypes in the form of bulk, surfaces and low dimensional structures. The prospects of tuning the properties of silicon carbide on the basis of fabrication of silicon rich and carbon rich by monitoring silicon to carbon ratio are discussed in detail.

Keywords: Ceramics; Silicon Carbide; Non-Stoichiometry