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**The Phenomenon of Multilimit Combustion
in the Silicon- Melamine- Promoter System**

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ABSTRACT

In this work, self-propagation high temperature synthesis (SHS) was used to synthesize the Si₃N₄-SiC composites. To carry out simultaneous nitridation and carbidization at comparatively low pressures and with the dominating role of α-Si₃N₄ phase in the products promoters, basically nitrogen containing organic solid compounds) were used. It was established that both the nitrogen penetrating to the reaction zone from the outside (by filtration) and the nitrogen contained in melamine act jointly and depending on the conditions, one of the two can dominate. It was discovered that in this system there subsist three combustion limits. The existence of three combustion limits in the melamine concentration in the Si-N₂-Teflon-melamine system was caused by variation in the reaction mechanism.

Keywords: SHS, composite, combustion limits, combustion mechanism, α-Si₃N₄.