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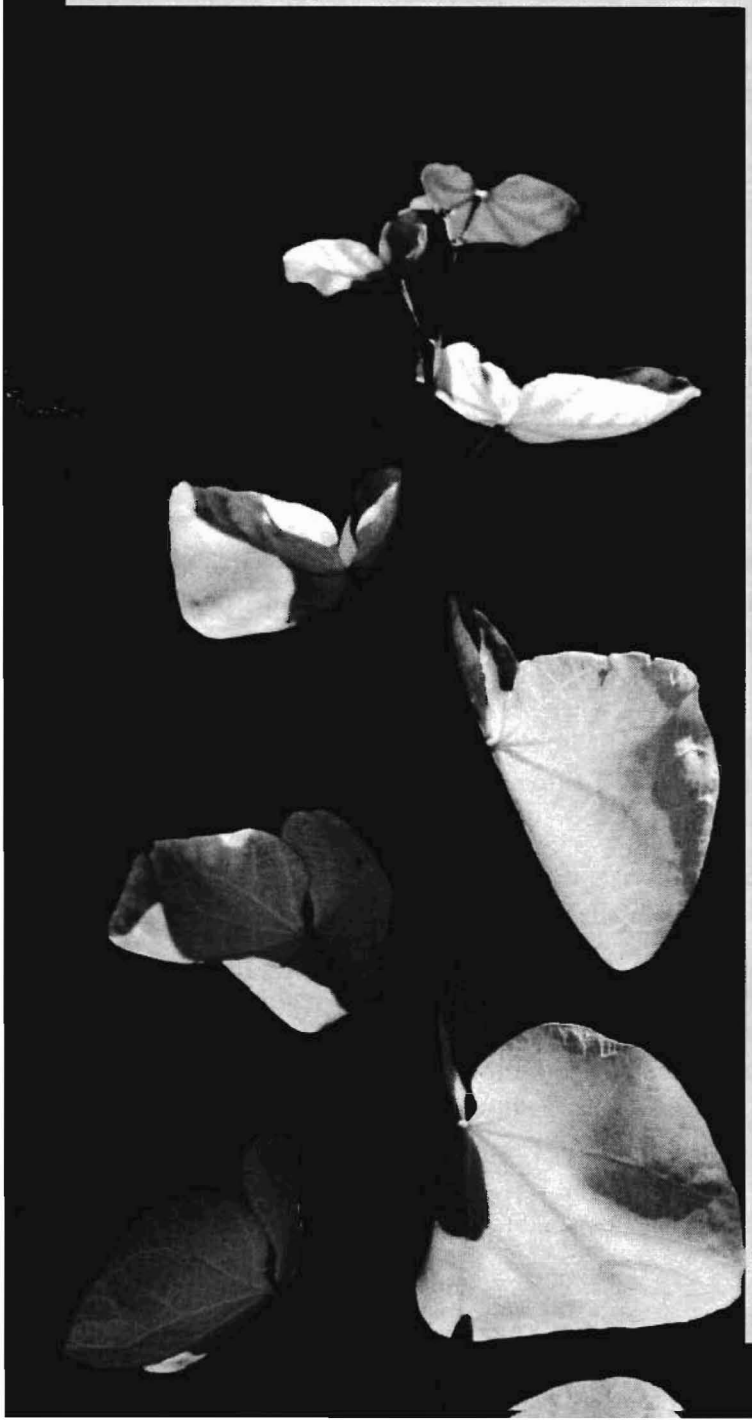

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Self-propagating High-Temperature Synthesis (SHS) in Si-PTFE-NaN3 system: towards new nanomaterials

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Abstract

Self-propagating High-Temperature Synthesis is nowadays one of the most promising methods in nanomaterial production. Among its advantages one may find: low cost, simple apparatus [fig.1], minimal impact on natural environment and short process time. However, there is still a lack of detailed knowledge about some reactions mechanisms. In our research we have been trying to adopt the spectroscopic and photographic diagnostics [fig.2] in order to better control the SHS in Si/PTFE/NaN_3 system. Some new nanostructures have been already discovered and analyzed by SEM, TEM, XRD and Raman spectroscopy. Further investigations allowed us to determine the influence of such process parameters as:

- gas atmosphere,
- initial pressure,
- substrate mass,
- optimum NaN_3 content in an initial mixture
- reactor configuration

on the products [fig.3] composition and morphology. Different purification methods were tested (wet chemistry rout and high temperature treatment). The complete system description is to be done within coming months.

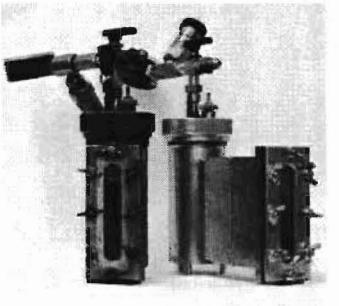

Figure 1. *An experimental set-up*

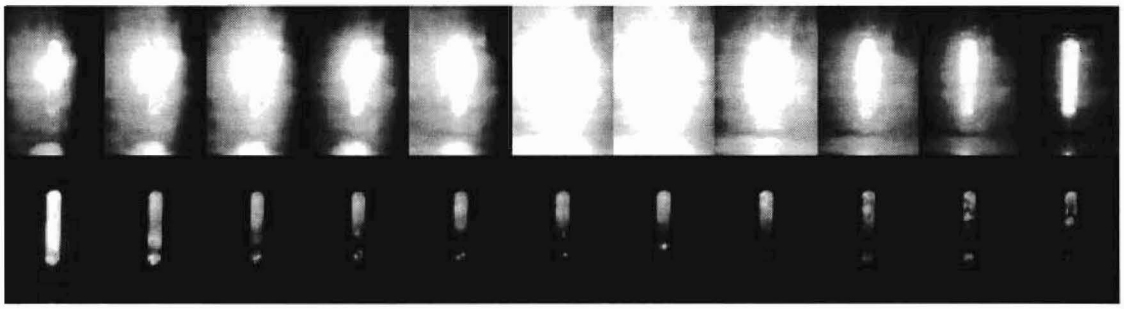

Figure 2. *A photo registration of combustion propagation*

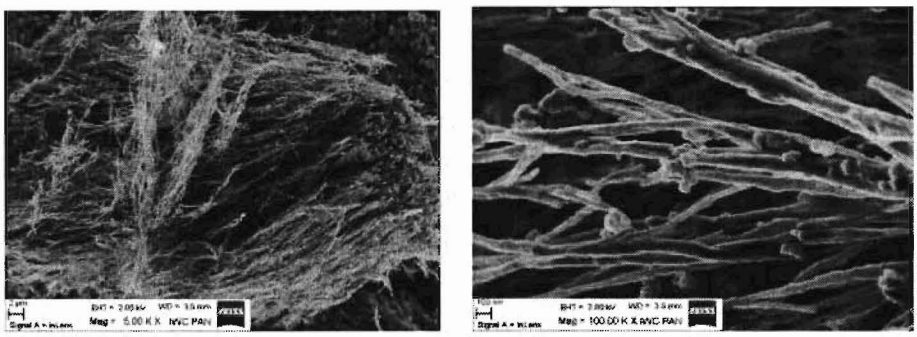

Figure 3. *Fibers obtained in air in Si/PTFE/NaN_3 35% system*

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