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**МЕЖДУНАРОДНАЯ КОНФЕРЕНЦИЯ**  
**Перспективные материалы**  
**с иерархической структурой**  
**для новых технологий**  
**и надежных конструкций**  
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**ТЕЗИСЫ ДОКЛАДОВ**

**MATHEMATICAL MODELING OF MULTILAYER COMPOSITE  
SOLID-PHASE SYNTHESIS TAKING INTO ACCOUNT  
THE REACTIVE LAYER MELTING**

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The problem of new materials creation with a various combination of properties such as wear resistant, heat resistance, strength is one of the most important problems in many industries. Especially promising developments are carried out in area of ceramic materials. Composite materials of different structures are interesting in respect of technological properties. However, a problem exists to form a durable contact between matrix and inclusions or between the layers depending on material employment.

In present work the exothermal reaction front propagation trough multilayer composite is considered. Inert layers in this composite layers alternate with layers consisting of a reaction mixture. The reaction runs between inert materials of various sizes, and its rate and temperature depend on conjugated material properties. Very high temperatures are undesirable due to appearing thermomechanical tension, which could adversely affect the quality of the obtained material. This problem can be solved with help of different ways. For instance, the melting of the reagent layer can be taken into account.

When joining materials by solid-phase synthesis problem of selecting criteria for ignition and stability of ignition connecting structure appears. Adiabatic, quasi-stationary, integral, and other criteria for evaluating the ignition time are known. The choice of criterion is defined by features of the initiation process, as well as physical factors considered in the model.

In this work the influence of the problem parameters and the melting of the reagent on the ignition characteristics and some energy characteristics determining the ignition stability is investigated.

**ИССЛЕДОВАНИЕ ВЛИЯНИЯ РЕЖИМОВ СВАРКИ ТРЕНИЕМ  
С ПЕРЕМЕШИВАНИЕМ С УЛЬТРАЗВУКОВЫМ ВОЗДЕЙСТВИЕМ  
НА ОСОБЕННОСТИ МАССОПЕРЕНОСА И РАСПРЕДЕЛЕНИЕ  
ТЕМПЕРАТУРЫ В СВАРНЫХ СОЕДИНЕНИЯХ**

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