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Brief Review of Kinetic Regularities of Ti_XC_Y-Ti Composites Synthesis

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Abstract. The main approaches to the synthesis of titanium carbide-based composites used in numerous studies during the last five decades are reviewed in order to generalize and analyze the correctness of phenomenological ideas to explain the physical processes that can occur during the interaction of titanium and carbon. The main theoretical approaches to the modeling of the synthesis process developed mainly in the field of combustion and explosion are described. These are models of solid-phase combustion, models with separation of reaction cells, and models of mechanics of heterogeneous media. Both advantages and disadvantages of the used approaches and models are analyzed, indicating those essential parameters which should be taken into account for a more adequate interpretation of the synthesis results. None of the known approaches can be used to predict the phase composition and structure when the synthesis conditions change.

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