

## **SHS for a Large-Scale Synthesis Method of Transition Metal Nanopowders**

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The combustion of  $\text{Me}_x\text{O}_y$ -Mg system (where  $\text{Me}_x\text{O}_y$  is:  $\text{Ta}_2\text{O}_5$ ,  $\text{Nb}_2\text{O}_5$ ,  $\text{TiO}_2$ ,  $\text{WO}_3$ ,  $\text{MoO}_3$ ) in the presence of large amount of alkali metal halide as a particle-size controlling agent (PSCA) was studied. The value of the combustion temperature according to content of PSCA was obtained. It was shown that the introduction of NaCl in an initial mixture as PSCA promoted the formation of nanocrystalline structure of transition metals. As a result, nano-sized titanium, tantalum, niobium, tungsten and molybdenum powders with particles size below 100 nm were successfully obtained. Unique properties, an unusually large shrinkage, and 87-90 % relative density were recorded at a temperature of 1100-1300°C during the sintering of tantalum nanopowder.