



Fig. 1. Schematic diagram of an arrangement for explosive synthesis of titanium carbide.

1: Mild steel container 2: Mixture of titanium metal powder and acetylene black 3: Mild steel plug 4: Plastic cone 5: Tetryl powder 6: Plastic tube 7: Plastic plug with a small hole 8: Electric detonator

An Explosive Synthesis of Titanium Carbide

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Titanium carbides were explosively synthesized from a mixture of titanium metal powder and carbon black by using the arrangement illustrated in Fig. 1. The eight grams of a stoichiometric mixture of titanium metal powder (Osaka Titanium Co., Ltd.) and acetylene black (Denki Kagaku Kogyo Kabushiki Kaisha) to be compacted were put in a mild steel container; this container was then sealed at its open end by a mild steel plug. The arrangement was completed by filling an annulus between the neck of the container and a plastic tube with about 65g. of a high explosive,

tetryl, and by setting up an electric detonator along a prolongation of the central axis of the container. Upon the detonation of the explosive charge, the original mixture, black in color, could be satisfactorily compacted into a grayish white, very hard, cylindrical shape. The X-ray diffraction pattern for the compact agreed well with that of titanium carbide. No additional lines could be observed.

In the same way, direct carburizations of aluminum and tungsten by carbon black have been achieved by the explosive compaction.

Further details of this work will appear in *J. Chem. Soc. Japan, Ind. Chem. Sec. (Kogyo Kagaku Zasshi)*.

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