complex carbides, and their analogs; electron transfer to the host lattice strengthens the T–T bonds. Band calculations on the basis of OPW and APW methods, and ESCA measurements suggest strong T–X bonds.

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Solid State Reactions with and without Gas Phase at High Temperatures with Special Consideration of High-Frequency Plasma

By Hk. Müller-Buschbaum

In recent years high-frequency plasma torches have found increasing use besides the usual laboratory heat supplies suitable for solid-state reactions. The high frequency energy is transferred to plasmas inductively or via a peak discharge at very high frequencies. Principally, there are two types of plasma torch.

1. High-pressure plasma torch (pressure range: 760 torr)

2. Low-pressure plasma torch (pressure range: 10^{-3} to 10^{-1} torr)

The use of torches opened one end (high-pressure plasma torches) for the production of large single crystals by a modified Verneuil process has been described by several authors. The main advantage of such torches is that a defined gaseous atmosphere can be set up at a low plasma speed. However, they have disadvantages; for example, the uncontrollable stay period of the sample in the hot zone at unknown reaction temperatures, and a separation of the starting material components by mechanical and electromagnetic forces. A low-pressure plasma inside a closed system developed by our group makes the heating of small amounts of a substance possible and is particularly suitable for the preparation of small single crystals. Compared with high pressure plasma torches there is one disadvantage of this closed type of torch, i.e., reduced pressure in the plasma which results in power reactions as far as thermally moderately decomposing or volatile substances are concerned. In a reaction between plasma and solid effects occur that are due to ionization of the gases: highly positively charged atoms of heavy gases (at extremely high temperatures) no longer exhibit the chemical characteristics of the corresponding molecular or atomic gas. This is also the case for ionized hydrogen, which does not have reducing properties. True "plasma chemistry" (in the plasma state only) therefore appears to be a difficult and questionable experimental field.

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Color by the Action of Mechanical Forces on Organic Molecules

By Hans Weidinger and Reinhard Steinmetz (lecturer)

Dehalogenation of 1,4-bis(9-bromo-9-fluorenyl)benzene (1) leads to the formation of the saturated solvent-containing oligomer (2) and not the expected quinonoid p-xylene (3) [1]. Osmometric molecular weight determinations in benzene at 37°C, in tetrahydrofuran at 45°C, and in pyridine at 60°C, yield values of about 1600 (n = 4) for the molecular weight of (1). A slight amount of cleavage and blue-violet coloration takes place when compound (3) is subjected to heat or mechanical pressure, both in the solid state and in solution. Although the monomeric fragments occur mainly as quinonoid p-

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