

An Improved Synthesis of Tetraboron Tetrachloride, B_4Cl_4

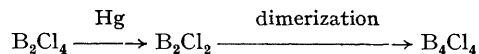
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Summary An improved synthesis of tetraboron tetrachloride by passing diboron tetrachloride through a mercury discharge cell is described.

TETRABORON TETRACHLORIDE occurs to the extent of 1 or 2 mg/day as a by-product in the discharge preparation of B_2Cl_4 .^{1,2} We have found that tetraboron tetrachloride can be made at the rate of about 10 mg/hr. by passing diboron tetrachloride through a mercury discharge cell of the type described in ref. 2. This represents a convenient two-stage synthesis from boron trichloride; the required B_2Cl_4 is prepared in the discharge apparatus and next day, after purification from boron trichloride, it is passed through the same discharge to yield B_4Cl_4 and considerable amounts of a yellow, involatile polymer. It seems probable that the B_4Cl_4 which is formed during the preparation of diboron

tetrachloride results from small amounts of B_2Cl_4 passing adventitiously through the discharge. A more obvious precursor of tetraboron tetrachloride is the diradical B_2Cl_2 :



rather than BCl which appears to be the intermediate in the formation of B_2Cl_4 from boron trichloride.³

Tetraboron tetrachloride melts at 95° (vacuum-sealed tube) and only shows signs of thermal degradation at temperatures in the region of 200°. Although other subchlorides of the general formula $(BCl)_n$, $n = 8-12$, are formed^{3,4} during the decomposition of diboron tetrachloride we have been unable to isolate B_4Cl_4 from this source.

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