Physical characteristics of chemically active plasma based on volatile halides in the processes of obtaining highly pure isotopically enriched substances

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Currently, interest in high-purity Si, B, Mo, and Ge with modified isotopic composition in crystalline and nanodispersed states has increased significantly. It is planned to create a quantum computer based on 28Si and 29Si [1]. Detectors based on 76Ge and 73Ge are needed to search for "dark matter" and study double beta decay [2]. To optimize the plasma-chemical processes for obtaining the specified target products, it is necessary to study the internal physical parameters of the plasma.

To determine the parameters of cold nonequilibrium plasma by contact and contactless methods, diagnostics of nonequilibrium chemically active plasma in mixtures of volatile halides of Si, Ge, B and Mo with H2 and Ar were carried out. Methods of thermodynamic and gas-dynamic analysis, as well as emission spectroscopy, were applied to thermal gas discharges. The main parameters of gas discharges, as well as the main chemical reactions affecting the formation of target products, were determined.

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