**Overview of Production Process and Existing Plant Configurations**

At present time the demand for polycrystalline silicon as the basic material for semi-conductor electronics and solar power industry will grow and grow. There are several methods for the industrial manufacture of polycrystalline silicon. One of them is the method of thermal decomposition (pyrolysis): monosilane is inserted into the reactor, where it reacts with the surfaces of the heated silicon rods, decomposing and depositing onto them. In the other method the monosilane filled with the fine particles of silicon should be inserted into the fluidized-bed reactor, where Silane is deposited in the form of powdered commodity.

Thus, Silane is used as initial material for the production of polycrystalline silicon. Nowadays there are two standard methods for the production of silane:

(1) using hydrogen reduction of trichlorosilane (SiHCl3), so-called "Siemens Process" and its improved version for disproportionation of trichlorosilane for the production of monosilane SiH4, developed by the Union Carbide Company.

(2) method for hydrolysis of various binary alloys, such as CaSi, CaSi2, MgSi and Mg2Si., among which only magnesium suicide (Mg2Si) represents real interest for the Silane manufacture. In Siemens process (1) SiHCl3 is produced in the reactor with boiling bed as a result of interaction between powdered metallurgical silicon and gaseous HCl. Obtained gas-vapor mixture is separated in filtration and condensation, and HCl and hydrogen return into process (recirculation). Then the condensate should be separated and SiHCl3 purified in the process of multistage purification. Purified trichlorosilane (SiHCl3) mixed with the hydrogen (H2) is inserted into the reactor of pyrolysis for the production of polycrystalline silicon.

Therefore, the process (1) allows to obtain high purity Silane, it has several disadvantages, for example, the process should be realized in chemically hostile environment at a high pressure, which requires expensive equipment, made from heat-resistant and chemically inert materials. Presence of chemically aggressive chlorine compounds corrodes equipment, thus contaminating Silane. Moreover, this process is complicated, power consuming and ecologically dangerous. These factors considerably increase the cost of polycrystalline silicon. The Process (2), on the contrary, is very simple, but the yield of Silane does not exceed 25-30%. This process also requires expensive magnesium suicide, which production in turn requires special equipment. Silane yield can be increased up to 80% owing to the interaction of magnesium suicide with salt ammonia in liquid ammonia. However, this process can be realized only at a high pressure and requires effective purification of silane from ammonia.

The most closely related method, which has been considered as prototype - is the method for the production of silane. According to the invention, the synthesis of silane can be realized through the effect of mineral acid aqueous solution on the industrial threefold alloys of Al/Ca/Si. The main advantage of this method is the simplicity of technological process, allowing using inexpensive initial materials. However, the present method does not allow synthesizing silane with relatively high yield regarding to the content of silicon in the alloy. Thus, the descried processes for the Silane production do not meet the requirements of its cost and its yield.

Technical purpose of suggested invention is to increase the yield of the finished product while decreasing its manufacturing self-cost.

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