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TOPIC: HYDRIDES

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Hydrides

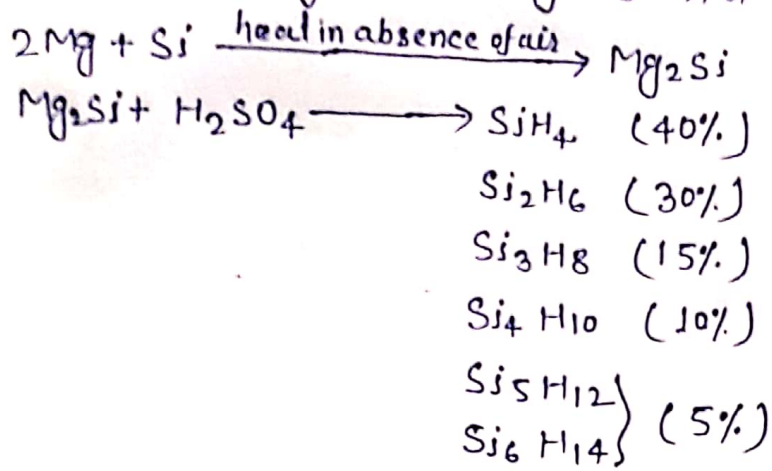
All the elements form covalent hydrides. but the number of compounds formed and the ease with which they form differs greatly. Carbon forms a vast number of chain and ring compounds including:

- 1 The alkanes (paraffins) C_nH_{2n+2}
- 2 The alkenes (olefines) C_nH_{2n}
- 3 The alkynes (acetylenes) C_nH_{2n-2}
- 4 Aromatic Compounds

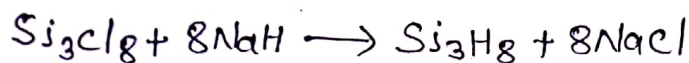
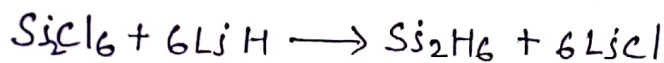
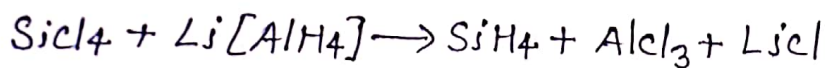
These are the basis of organic chemistry. There is a strong tendency to catenation (forming chains) because the C-C bond is very strong.

Silicon forms a limited number of saturated hydrides, Si_nH_{2n+2} , called the silanes. These may exist as straight chains or branched chains, containing up to eight Si atoms. Ring compounds are very rare. No analogues of alkenes or alkynes are known. Monosilane SiH_4 is the only silicon hydride of importance. SiH_4 and $SiHCl_3$ were first made by treating an Al/Si alloy with dilute HCl. A mixture of silanes was prepared by hydrolysing magnesium silicide. Mg_2Si , with sulphuric or phosphoric acid. These compounds are colourless gases or volatile liquids. They are highly reactive, and catch fire or explode in air. Apart from SiH_4 they are thermally unstable.

It only became possible to study them when A. Stock invented a method of handling reactive gases in a vacuum frame.



More recently monosilane has been prepared by reducing SiCl_4 with $\text{Li}[\text{AlH}_4]$, LiH or NaH in ether solution at low temperatures. This is a much better method, as it gives one product rather than a mixture and it gives a quantitative yield.



Silanes may also be prepared by direct reaction by heating Si or ferrosilicon with anhydrous HX or RX in the presence of a copper catalyst.

