is consistent with removal of HI, especially in the case of the diiodosilane. Furthermore, it was observed that H_2SiI_2 decomposes below 550 °C but $HSiI_3$ does not. Thus

$$nH_2SiI_2(g) \rightarrow Si_n + 2nHI(g)$$

More than one molecule is presumed to be involved because the reaction seems to occur more easily for higher fluxes of molecules. This mechanism is also consistent with the fact that little evidence of I_2 formation is observed during decomposition of the diiodosilane.

For triiodosilane, iodine formation is observed, and the higher temperature required for decomposition may be indicative of another mechanism. One possibility is

$$HSiI_3(g) \rightarrow HSiI(g) + I_2(g)$$

$$nHSiI(g) \rightarrow Si_n + nHI(g)$$

Another reaction known to occur is

$$2HSiI_3(g) \rightarrow H_2SiI_2(g) + SiI_4(g)$$

and decomposition of the diiodosilane would lead to amorphous silicon.

The presence of a small amount of iodine in the film is consistent with the need for more than one molecule in the decomposition reaction. Thus, trapping of a partially dehydrohalogenated silane would account for the incorporation of the iodine.

Summary

Another possible way of depositing a-Si from iodisilanes by thermal decomposition is demonstrated by using the experimental setup shown in Figure 2. Due to the absence of vapor nucleation of chemical intermediates produced from decomposed iodosilanes and due to the nonexplosive nature, iodosilane precursors emerge as new sources for the deposition of a-Si.

Acknowledgment. This work is funded in part by a grant from the Natural Sciences and Engineering Research Council of Canada to M.C. and R.T.O. We are grateful to Professor Charles Fischer for the RBS data and to Professor M. Fujimoto for the ESR data.

Registry No. a-Si, 7440-21-3; H_2SiI_2, 13760-02-6; $HSiI_3$, 13465-72-0.

Additions and Corrections

1990, Volume 2

Walter Torres and Marye Anne Fox*: Rectifying Bilayer Electrodes: Layered Conducting Polymers on Platinum.

Page 310. The captions for Figures 5 and 6 should be reversed.