

VIII. CONCLUSIONS

The purpose of this study was to determine the feasibility of using a liquid germanium film, plated on a graphite or molybdenum substrate, as a target in the molecular beam machine. This purpose was accomplished. It was concluded that neither graphite nor molybdenum is a suitable substrate material and, therefore, the proposed targets are infeasible.

#### IX. RECOMMENDATIONS FOR FUTURE CONSIDERATIONS

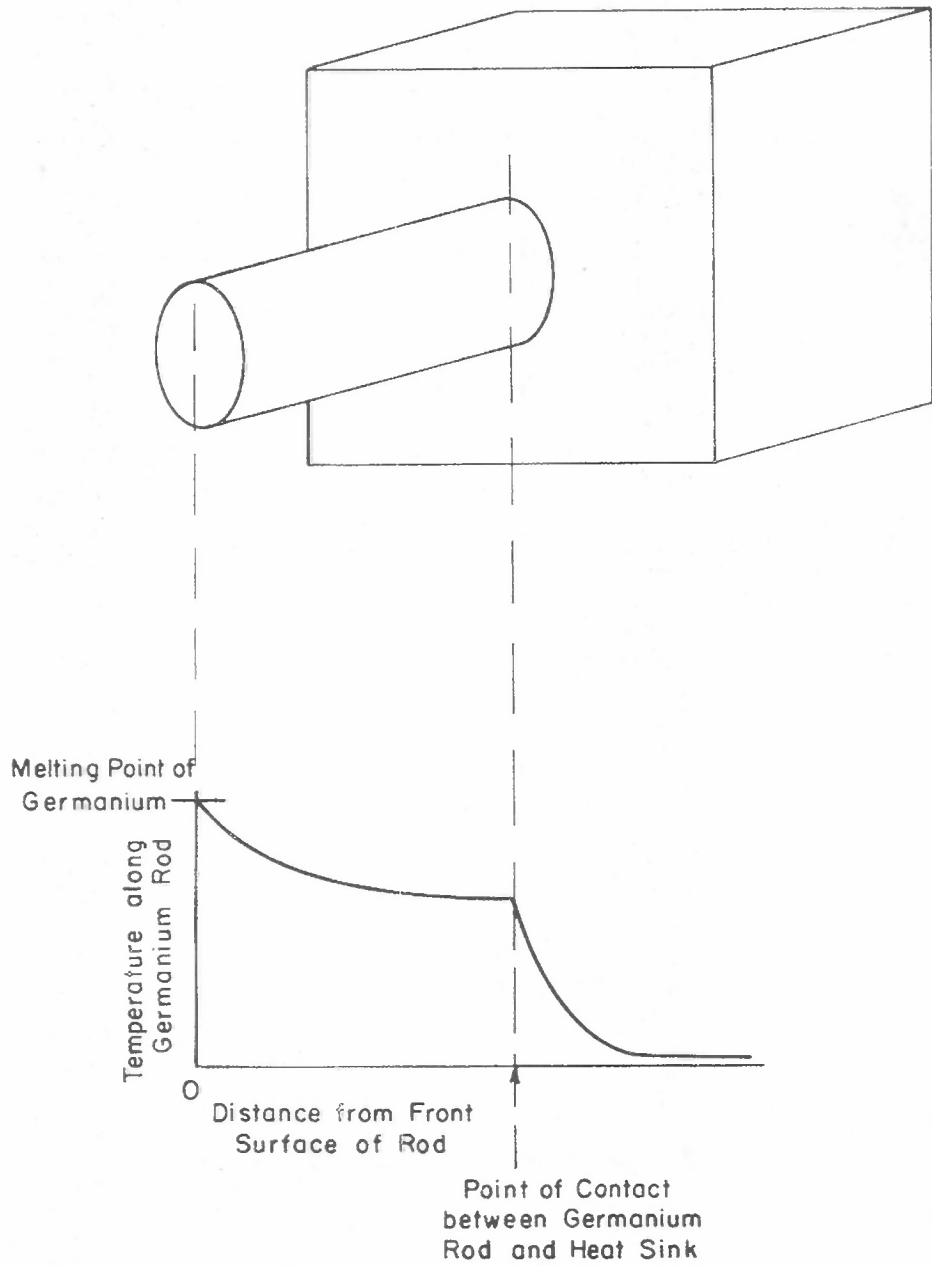
Even though the first concerted attempt to develop a target to study a gas-liquid reaction in the molecular beam machine was not successful, there remain many other possible approaches.

The most obvious approach would be to test other materials for use as substrates. For example, various ceramics might be suitable for this application.

Instead of a solid substrate, it might be desirable to employ a porous substrate. The voids in such a substrate could be filled with germanium. During a reaction run the target would be heated. As the germanium left the surface of the substrate, liquid germanium held within the pores could creep to the surface to maintain the film.

It might be possible to use a germanium rod as a target. See Fig. 20. The rod could be heated by electron bombardment, by a laser beam, by an electric current, or by induction. If the back of the rod were connected to a heat sink a thermal gradient would be set up as depicted by the graph in Fig. 20. If the shape of the rod were chosen correctly and the heating controlled properly, it should be possible to maintain a thin liquid film on the front surface of the germanium rod.

Another possibility is that the molecular beam machine could be altered or that a new molecular beam machine could be built to accommodate horizontal targets. This would necessitate raising the molecular beam from the horizontal, but might be the simplest alternative.



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Fig. 20. Heat sink target.

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