

Abstract Submitted
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Peltier Refrigerators for Molecular Ion Sources¹ ADY HERSHCOVITCH, Brookhaven National Lab — Molecular ion sources have been considered for various applications. In particular, there is considerable effort to develop decaborane and octadecaborane ion sources for the semiconductor industry. Since the invention of the transistor, the trend has been to miniaturize semiconductor devices. As semiconductors become smaller (and get miniaturized), ion energy needed for implantation decreases, since shallow implantation is desired. But, due to space charge (intra-ion repulsion) effects, forming and transporting ion beams becomes a rather difficult task. These problems associated with lower energy ion beams limit implanter ion currents, thus leading to low production rates. One way to tackle the space charge problem is to use singly charged molecular ions. A crucial aspect in generating large molecular ion beam currents is ion source temperature control. Peltier coolers, which have in the past successfully utilized in BaF₂ and CSI gamma ray detectors, may be ideal for this application. Clogging prevention of molecular ion sources is also a hurdle, which was overcome with special slots. Both topics are to be presented.

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Ady Hershcovitch
Brookhaven National Lab

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