

Lawrence Berkeley National Laboratory

LBL Publications

Title

Lithium alumino-silicate ion source development

Permalink

<https://escholarship.org/uc/item/5104831x>

Authors

Roy, P.K.
Seidl, P.A.
Kwan, J.W.
[et al.](#)

Publication Date

2010-07-01

Lithium alumino-silicate ion source development

P. K. Roy, P. A. Seidl, J. W. Kwan, W. Greenway, W. Waldron, J. K. Wu, and K. Mazaheri

Lawrence Berkeley National Laboratory (LBNL)

We report experimental progress on Li^+ source development in preparation for warm dense matter heating experiments. To uniformly heat targets to electron-volt temperatures for the study of warm dense matter, we are pursuing the use of a low ($E < 5$ MeV) kinetic energy singly ionized lithium beam and a thin target. Two kinds of lithium (Li^+) alumino-silicate ion sources, β -spodumene and β -eucryptite, each of area 0.31 cm^2 , have been fabricated for ion emission measurements. These surface ionization sources are heated to 1200 to 1300°C where they preferentially emit singly ionized alkali ions. Tight process controls were necessary in preparing and sintering the alumino-silicate to the porous tungsten substrate to produce an emitter that gives uniform ion emission, sufficient current density and low beam emittance. Current density limit of the two kinds have been measured, and ion species identification of possible contaminants has been verified with a Wien ($E \times B$) filter.

This work was supported by the Director, Office of Science, Office of Fusion Energy Sciences, of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.