GRAPHITE SUBLIMATION TESTS FOR TARGET DEVELOPMENT FOR THE MUON COLLIDER/NEUTRINO FACTORY*

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Graphite sublimation tests have been conducted in high temperature ovens, which are operated either in high vacuum or in an one atmosphere cover gas of helium (or argon). Preliminary data (Ref. 1) of the sublimation rate of graphite foils at ~2400 K in vacuum are consistent with theoretical prediction. Additional tests of graphite rods (15 mm in diameter and 300 mm long) have been conducted in high vacuum and in cover gasses of helium as well as argon. The sublimation rate (1.7 mg/hour) at 2350 K level in static argon cover gas (> 1 atmosphere) is lower than that (5.8 mg/hour) in high vacuum. This unique approach of using a cover gas to reduce sublimation rate could allow a robust radiatively cooled graphite target for the Muon Collider/Neutrino Factory as proposed in the conceptual design study (Ref. 2). In this paper, we will present and discuss the results of graphite sublimation tests including the test setup in the high temperature ovens.

References:

1. J. R. Haines and C. C. Tsai, "Graphite Sublimation Tests for the Muon Collider/Neutrino Factory Target Development Program," ORNL/TM-2002/27, Oak Ridge National Laboratory, Oak Ridge, Tennessee (February 2002).

2. N. Holtkamp et al., "FNAL Feasibility Study on a Neutrino Source Based on a Muon Storage Ring," Fermi National Laboratory, Batavia, Illinois (April 2000).

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