Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

New design of a microcalorimeter with enhanced accuracy through the consideration of thermal loss of the membrane platform K. S. SUH, H. J. KIM, J. W. KIM, Y. D. PARK, KEE HOON KIM, CSCMR and FPRD Department of Physics and Astronomy, Seoul National University, Seoul 151-747, Korea — We report on the development of a Si-N/Si based microcalorimeter for measuring specific heat of small samples in a wide temperature range. By using well-known MEMS fabrication techniques [1], the heater and sensor elements are integrated on the Si-N membrane. The fabricated calorimeter is operated by a custom-made program based on the curve fitting method [2]. By comparing measured thermal conductance (λ) from the membrane platform to the thermal reservoir in three different designs, we find λ can critically affect the accuracy of measurement, and that the geometry of metal lines is a key parameter to controlλ. Based on those findings, we provide a new design of microcalorimeter resulting in the specific heat of Cu ($\sim 300\ \mu g$) consistent with literature values within 5% in a temperature range between 20 and 300 K.
†parkyd@phya.snu.ac.kr, khkim@phya.snu.ac.kr
[1] D. W. Denlinger *et al.*, Rev. Sci. Instrum. 65, 946 (1994); S. L. Lai *et al.*, Appl. Phys. Lett. 67, 1229 (1995).
[2] K. S. Suh *et al.*, J. Korean Phys. Soc. 49, 1370 (2006); J. S. Hwang *et al.*, Rev. Sci. Instrum. 68, 94 (1997).

K. S. Suh
CSCMR and FPRD Department of Physics and Astronomy,
Seoul National University, Seoul 151-747, Korea

Date submitted: 26 Nov 2006 Electronic form version 1.4