Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Mo_5PB_2: a new superconductor in the Cr_5B_3 structure type with T_c = 9.2 K[1] MICHAEL MCGUIRE, DAVID PARKER, Oak Ridge National Laboratory — Superconductivity has been reported recently in several ternary silicide-borides adopting the tetragonal Cr_5B_3 structure type, including $Nb_5Si_{3-x}B_x$, Mo_5SiB_2, and W_5SiB_2, with critical temperatures ranging from 5.8-7.8 K. Here we report superconductivity with T_c exceeding 9 K in the phosphorus-containing analogue Mo_5PB_2. We have synthesized polycrystalline samples of the compound, made measurements of electrical resistivity, magnetic susceptibility, and heat capacity, and performed first principles electronic structure calculations. The highest T_c values occur in slightly phosphorus rich samples, with composition near $Mo_5P_{1.1}B_{1.9}$. Together with the measured properties, the calculations suggest the superconductivity in these materials may be multi-band.

[1]Research sponsored by the US Department of Energy, Office of Science, Basic Energy Sciences, Materials Sciences and Engineering Division.

Michael McGuire
Oak Ridge National Laboratory

Date submitted: 05 Nov 2015 Electronic form version 1.4