Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Searching for High-T_c Superconductivity in Low-Z, Low-Ne Materials O-PAUL ISIKAKU-IRONKWE[1], The Center for Superconductivity Technologies, Michael Okpara University of Agriculture, Umudike, Nigeria, TIMOTHY HAUGAN, Mechanical Energy Conversion Branch, Propulksion Directorate, Wright-Patterson AFB, Ohio 45433-7251, ALEX ANIMALU, University of Nigeria, Nsukka, Anambra State, Nigeria — The discovery in 2001 of HTSC at 39K in MgB_2, a low-atomic number (Z) and low-valence electron count per atom (Ne) material, strongly suggested that similar materials may exist with comparable or even higher Tcs. Efforts to find MgB_2-like HTSC materials in binary and ternary systems have not been very successful. Using recently developed material specific formula for Tc, we have extended the computational and experimental search for potential low-Z, low-Ne HTSCs beyond the ternary structure into the 4 and 5-element systems. Exploring the family of low-Z, low-Ne materials represented by Z = 1.333p + 2 where p is an integer, we find in this broad spectrum, hundreds of potential HTSC materials. Here we present some of the combinatorial-computational datasets and preliminary experimental results using a novel non-DFT material-specific characterization dataset (MSCD) method. MSCD promises to accelerate the computational search for new materials, particularly superconductors. The computations and preliminary experimental results suggest that HTSC, comparable to the cuprates may exist in low-Z, low-Ne materials with 4 and 5-element systems.

[1]RTS Technologies, San Diego CA 92124

O-Paul Isikaku-Ironkwe
The Center for Superconductivity Technologies,
Michael Okpara University of Agriculture, Umudike, Nigeria

Date submitted: 20 Nov 2012 Electronic form version 1.4