Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Material Specific Rational Design of $A_1B_2C_3O_7$ High-Tc Superconductors *without* Copper [A, B, C = Cations] O'PAUL ISIKAKU-IRONKWE, MICHAEL J. SCHAFFER, RTS Design Technologies, San Diego CA 92101 — Soon after the discovery of $YBa_2Cu_3O_7$ with Tc = 93K, a similar structured system with Ag replacing Cu was discovered with a Tc = 50K. Also, the discovery of $Ba_0.6K_0.4BiO_3$ with Tc = 30K indicated that Cu was not indispensable for high temperature superconductivity (HTSC). Latter, the discoveries of the Pnictide and Chalcogenide high-Tc superconductors confirmed those earlier experimental indications. Using our recently developed Material Specific Characterization Dataset (MSCD) model for analysis and design of superconductors, we have computed many designs that satisfy the MSCD characteristics of $YBa_2Cu_3O_7$as a design model. Our design recognizes the valence state characteristics that make $YBa_2Cu_3O_6$a semiconductor, while $YBa_2Cu_3O_7$is a superconductor. Here we present ten material specific rational design examples of potential $A_1B_2C_3O_7$ HTSCs without Cu, using the $YBa_2Cu_3O_7$ design model. This MSCD design model opens the possibility for search and discovery of high-Tc oxide superconductor systems without copper.

O'Paul Isikaku-Ironkwe
RTS Design Technologies

Date submitted: 01 Dec 2015 Electronic form version 1.4