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Investigation of the normal and superconducting states of $Ba_xNa_{1-x}Ti_2Sb_2O$ ($0 \geq x \geq 0.33$) : a pnictide oxide compound with hole doped titanium-oxygen layers M. GOOCH, B. LORENZ, TcSUH, Dept of Physics, University of Houston, P. DOAN, Z.J. TANG, J. TAPP, A. MÖLLER, A.M. GULOY, TcSUH, Dept of Chemistry, University of Houston, D. PRATT, J. LYNN, NIST, Center for Nuetron Research, C.W. CHU, TcSUH, Dept of Physics, University of Houston and Lawrence Berkeley National Laboratory — The interest in layered transition metal oxides/pnictides was re-ignited by the discovery of the iron pnictides; 2 such as examples are, $Na_2Ti_2Pn_2O$ and $BaTi_2As_2O$. Both compounds are comprised of a layered structure and exhibit a SDW/CDW, similar to the iron pnictide parent compounds. It is well established that by suppressing the SDW, superconductivity emerges in pnictides; therefore, can a similar approach be used for these titanium based pnictide oxides? To date, the lowering of the critical temperature for the SDW/CDW has been reported, but no superconductivity was seen for $BaTi_2As_2O$. We report the effects of hole doping on $BaTi_2Sb_2O$ and its influence on the SDW and superconducting states. Initial findings from neutron scattering will also be discussed. Our parent compound, which is similar to the $BaTi_2As_2O$ in structure, shows a SDW/CDW at 57 K. A systematic lowering of the critical temperature is seen for the SDW/CDW with increased doping. In addition, the superconducting temperature increases up to 6 K. The phase diagram as a function of doping is derived from the normal and superconducting states of the system. The lowering of the critical temperature of the SDW/CDW seems to be the key for the emergence of superconductivity.

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