Abstract Submitted
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Transport properties of layered Ba(Pb,Bi)O_3 thin films G.W.J. HASSINK, K. MUNAKATA, R.H. HAMMOND, M.R. BEASLEY, Geballe Laboratory for Advanced Materials, Stanford University, Stanford, CA 94305 — Doped $BaBiO_3$ is a 3D oxide superconductor with a maximum T_c of 30 K for $Ba_{0.6}K_{0.4}BiO_3$. There has been a lot of discussion on whether this high T_c can be explained purely by electron-phonon coupling with a high coupling constant λ. In addition, the presence of real-space paired $6s^2$ electrons in the parent compound raise intriguing questions about whether there is an electron-electron coupling interaction as well. This possible negative-U interaction might be used to implement the suggestion by Berg, Orgad and Kivelson [Phys.Rev.B 78, 094509] that for a two-layer system where one layer provides electron pairing interaction and the other layer is conducting, the whole can be superconducting with a high T_c. Here we discuss the transport properties of $BaPbO_3$/$BaBiO_3$ bilayers, where the $BaBiO_3$ layer is thought to act as the pairing layer, while the $BaPbO_3$ acts as the conducting layer. The transport behavior changes to insulating upon decreasing the metallic $BaPbO_3$ layer thickness at values that single films are expected to still be metallic.

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