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**Thermal and photoconductivity at the La$_{1-x}$Sr$_x$CrO$_3$/SrTiO$_3$(001) interface**

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We have investigated the electronic and photophysical properties of interfaces between La$_{1-x}$Sr$_x$CrO$_3$ and SrTiO$_3$(001) as prepared by molecular beam epitaxy. LaCrO$_3$ is a III-III antiferromagnetic insulator whereas SrCrO$_3$ is a II-IV metallic oxide. Substituting Sr$^{2+}$ for La$^{3+}$ in LaCrO$_3$ effectively dopes holes into the top of valence band, reducing the band gap and the resistivity, and generating a $p$-type oxide semiconductor. In contrast, SrTiO$_3$ is a wide-gap II-IV semiconductor that is readily made $n$-type by La doping. Therefore, the La$_{1-x}$Sr$_x$CrO$_3$/SrTiO$_3$(001) system has much potential for interesting interface physics with regard to studying intrinsic conductivity via electronic reconstruction and electron-hole pair separation upon light irradiation. However, there are inherent physical and chemical complexities at these interfaces and within the bulk of the La$_{1-x}$Sr$_x$CrO$_3$ films which can have profound effects on the associated functional properties. In this talk, we present some of our most recent results from this ongoing investigation.

In collaboration with Kelvin Zhang, Du Yingge, Sushko Peter, Bowden Mark, Shutthanandan V, Pacific Northwest National Laboratory; and Shawn Sallis, Louis Piper, Binghamton University.