Electronic properties of low-dimensional niobates and titanates

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The homologous series of compounds $A_nB_nO_{3n+2}$, where *A* is a rare earth or alkaline earth metal, *B*=Nb or Ti, and n=2,3,...,∞, comprise compounds with a variety of properties, including Mott-Hubbard insulators, metals, and ferroelectric band insulators. Two of its members, $SrNbO_{3.4}$ and $LaTiO_{3.4}$, were shown to have a quasi-one-dimensional metallic character despite their two-dimensional crystal structure. For both compounds electron-phonon coupling appears to play an important role, leading to the formation of polarons. Furthermore, for $SrNbO_{3.4}$ the opening of an energy gap at the Fermi energy was found suggesting a Peierls-type instability at low temperature. The electronic properties of low-dimensional $SrNbO_{3.4}$ and $LaTiO_{3.4}$ in comparison with other members of the series will be presented. Recent pressure-dependent optical studies on $LaTiO_{3.4}$ will also be discussed.