Superconductivity at 7.7 K in new hexagonal bronze Hg\textsubscript{x}ReO\textsubscript{3}
KENYA OHGUSHI, University of Tokyo, JST-TRIP, AYAKO YAMAMOTO, RIKEN, JST-TRIP, YOKO KIUCHI, CHANDREYEE GANGULI, University of Tokyo, KAZUYUKI MATSUBAYASHI, YOSHIYA UWATOKO, University of Tokyo, JST-TRIP, HIDENORI TAKAGI, RIKEN, University of Tokyo, JST-TRIP
— We have successfully synthesized a new rhenium-based hexagonal bronze material, Hg\textsubscript{x}ReO\textsubscript{3}, which exhibits superconductivity with the transition temperature $T_c = 7.7$ K at ambient pressure and 11.1 K at 4 GPa. This compound is a superconductor with the highest $T_c$ among hexagonal bronzes. Moreover, it presents the novel crystallographic feature that (Hg\textsubscript{2})\textsuperscript{2+} polycations, in contrast to monatomic cations in known hexagonal bronzes, are incorporated into open channels. There is evidence that conducting electrons tightly couple with Hg-related phonons. Our results inspire detailed studies on the role of the rattling phonon in the occurrence of superconductivity in the hexagonal bronzes.

Kenya Ohgushi
University of Tokyo, JST-TRIP

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