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Ru-Ru Dimers in honeycomb-layered Li_2RuO_3 FEI-TING HUANG, Rutgers University, J.J. YANG, Laboratory for Pohang Emergent Materials and Department of Physics, Pohang University, Y.Z. WANG, Y. HORIBE, S.-W. CHEONG, Department of Physics and Astronomy, Rutgers University — Dark-field transmission electron microscopy and sub-Å aberration-corrected scanning transmission electron microscopy (STEM) have been used to investigate the local structural properties of Li_2RuO_3 We found intriguing Ru-Ru dimerization in the Ru honeycomb skeletons associated with the spin-orbital coupling of the $4d$ electrons below 540 K. Furthermore, we demonstrated that the Ru-Ru dimers can be delicately broken through various antiphase boundaries and chemical doping. Soliton-like walls in the Ru-Ru dimer lattice are unambiguously observed in real space, and are found to order in a periodic manner for particular situations. The correlation between macroscopic physical properties and local structural distortions in the Li_2RuO_3 will be discussed in detail.

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