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Correlation between superconductivity and bond angle of CrAs chain in non-centrosymmetric compounds A2Cr3As3 (A=K, Rb) ZHE WANG, WEI YI, QI WU, JING GUO, YOUGUO SHI, XIANXIN WU, JIANGPING HU, LILING SUN, ZHONGXIAN ZHAO, Institute of Physics, Chinese Academy of Sciences (CAS), VLADIMIR A. SIDOROV, Institute for High Pressure Physics, Russian Academy of Sciences, GUANGHAN CAO, Department of Physics, Zhejiang University, KE YANG, AIGUO LI, Shanghai Synchrotron Radiation Facilities — Non-centrosymmetric superconductors have recently received special attentions due to the expectation of unconventional pairings and exotic physics associated with such pairings. The superconductors A2Cr3As3 (A=K, Rb) belongs to such kind of superconductor. In this study, we are the first to report the finding that the superconductivity of A2Cr3As3 (A=K, Rb) has a positive correlation with the extent of non-centrosymmetry. Our in-situ high pressure ac susceptibility and synchrotron x-ray diffraction measurements reveal that the larger bond angle of As-Cr-As in the CrAs chains can be taken as a key factor controlling superconductivity. While the smaller bond angle and the distance between the CrAs chains also affect the superconductivity due to their structural connections with the larger angle. We find that the value difference between large and small angle is in favor of superconductivity. These results are expected to shed a new light on the underlying mechanism of the superconductivity in these Q1D superconductors and also to provide new perspective in understanding other non-centrosymmetric superconductors.

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