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X-ray diffraction study of charge stripe order in $La_{1.875-x}Ba_{0.125-x}Sr_xCuO_4$ HIROYUKI KIMURA, IMRAM, Tohoku University, YUKIO NODA, HIDETO GOKA, IMR, Tohoku University, MASAKI FUJITA, KAZUYOSHI YAMADA, MASAICHIRO MIZUMAKI, JASRI, SPring-8, NAOSHI IKEDA, HIROYUKI OHSUMI — The charge stripe order in $La_{1.875-x}Ba_{0.125-x}Sr_xCuO_4$ with $0.05 \leq x \leq 0.10$ and its relevance with high-T_c superconductivity have been investigated by synchrotron X-ray diffraction. For $x = 0.05$, as temperature decreases, incommensurate superlattice peaks associated with the stripe order appear just below the structural phase transition temperature T_{d2}, indicating the strong relevance between the formation of the charge stripe order and the structural phase transition. However, in $x = 0.075$ and 0.09, the superlattice peaks emerge far above T_{d2} as a short range correlation, indicating a precursor of charge ordering. Furthermore, temperature dependences of the superlattice peak intensity, correlation length, and incommensurability for $x = 0.05$ are different from those for $x = 0.075$ and 0.09. These results suggest that the transition process into the charge stripe order strongly correlates with the order of the structural phase transitions. A quantitative comparison of the structure factor associated with the charge order have been also made for all the samples.

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