

Intrinsic defect structures of polycrystalline CaFe_4As_4 superconductor

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Supplementary data

Figure S1(a) shows the ADF image, and its Fourier transform is shown in (b). Since the strains are very localized, it is observed as the streak around the spots.

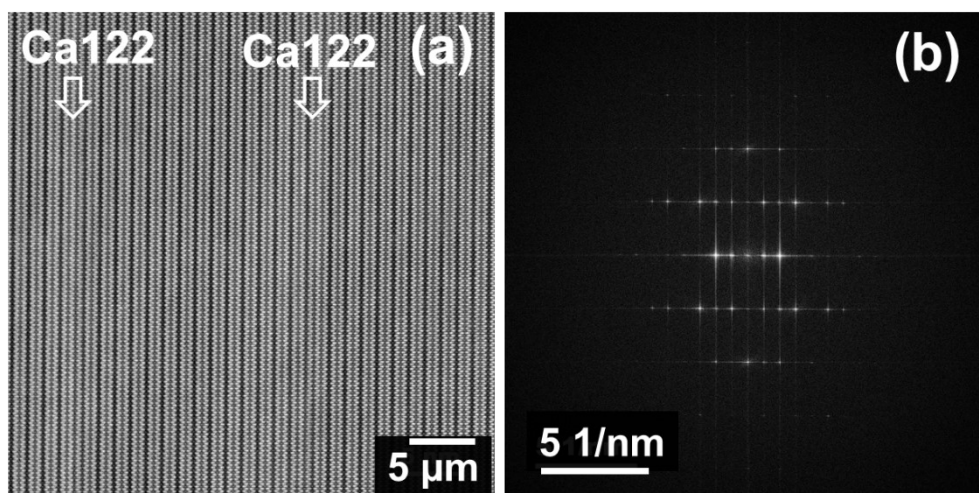


Fig. S1. (a) ADF image (Fig. 4(a)) and its Fourier transform (b).

The distribution of each element in the CaK1144 polycrystalline sample was investigated using the resolution improved STEM image (selected area in Fig. 3(d)) by the maximum entropy method and rotated by 90° . The ADF image is shown along with the element intensity profiles of Ca and K in Fig. S2. The intensities of the K and Ca profiles are observed to migrate in a stepwise manner, indicating Ca122 defect exchange.

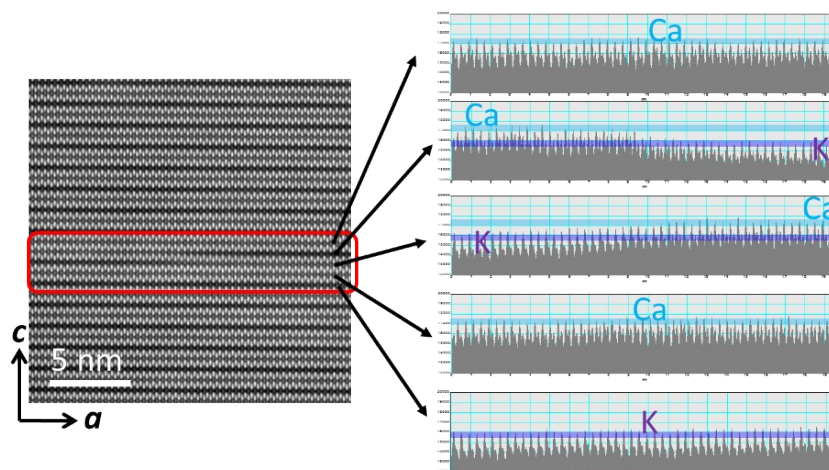


Fig. S2. STEM-ADF image and the strength profile for the elements Ca and K. The change of the Ca/K sites in defects can be indicated by stepwise change of quantified brightness of the image.

The strain fields resulted by different defect structures in polycrystalline CaK1144 sample are shown in Fig. S3.

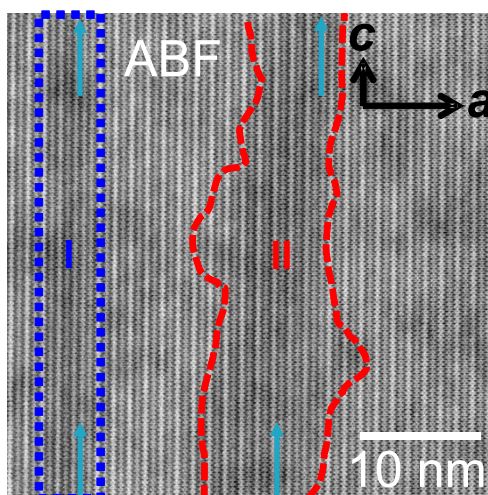


Fig. S3. ABF image of the CaK1144 polycrystalline sample with the indication of contrast area as well as Ca122 defect layers.