

Type of the Paper (Article, Review, Communication, etc.)

Supplementary Material: Simultaneous multi-Bragg peak coherent X-ray diffraction imaging

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Laue microdiffraction patterns recorded on the bare sapphire substrate and at the position of a gold crystal are presented in Fig. S1(a) and (b), respectively. A background subtracted Laue microdiffraction pattern where the diffraction pattern taken on the bare substrate is subtracted from the one taken at the gold crystal is displayed in Fig. S1(c).

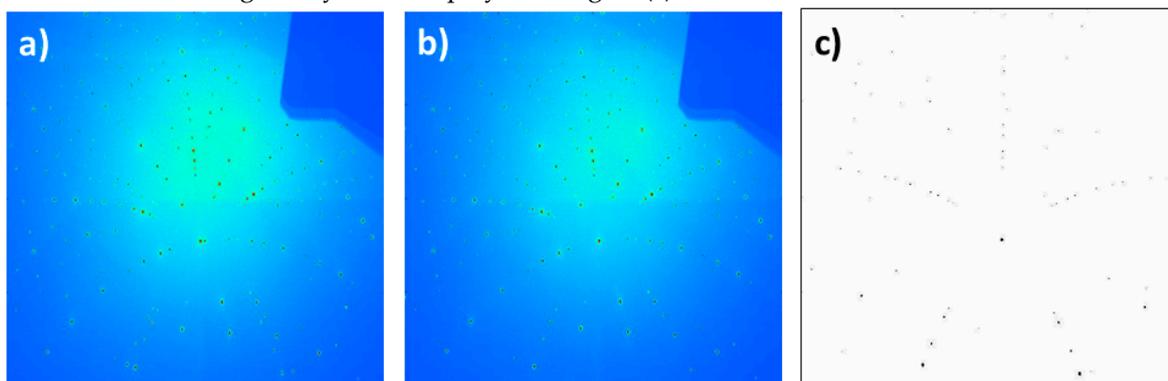


Figure S1. Laue microdiffraction pattern a) of the twinned gold crystal on a sapphire substrate and b) of the bare sapphire substrate taken few micrometer away from the Au crystal. c) Background subtracted Laue microdiffraction pattern of the Au crystal.

Figure S2(a) and (b) show the indexation of the Laue microdiffraction pattern for a twinned Au crystal assuming a $\Sigma 3$ relation between the two crystal parts. The blue dots represent the experimental Laue spots while the theoretical diffraction pattern is represented by red stars. Every second diffraction peak measured experimentally is indexed by the theoretical diffraction pattern of a gold crystal with a surface orientation along Au [111] (Fig. S2(a)). A rotation of 60° of the theoretical diffraction pattern and, thus a $\Sigma 3$ relation of the two crystal parts, results in the indexation of exactly the other half Laue spots that have not been indexed before (Figure S2(b)).

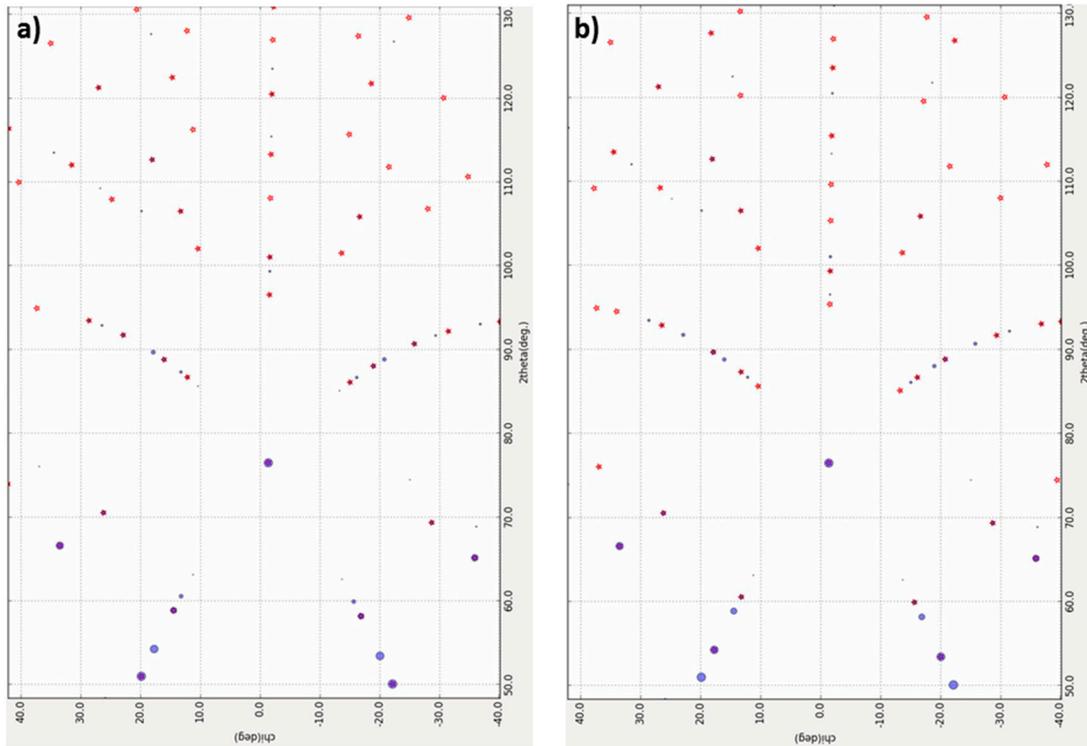


Figure S2. Indexed Laue microdiffraction patterns of one Au crystal assuming that it consists of two parts that have a $\Sigma 3$ relation.

The intensity profile of the incident polychromatic X-ray beam as a function of the energy is presented in Figure S3, which is fitted by a polynomial function. The indexed Laue spots with their corresponding intensity and the energy of the diffracted X-rays are superimposed with the energy spectrum of the incident beam. By normalizing the intensity of the diffracted Laue spots by the actual incident intensity for this particular energy allows for determining the volume ratios of the two variants of the twinned Au crystal.

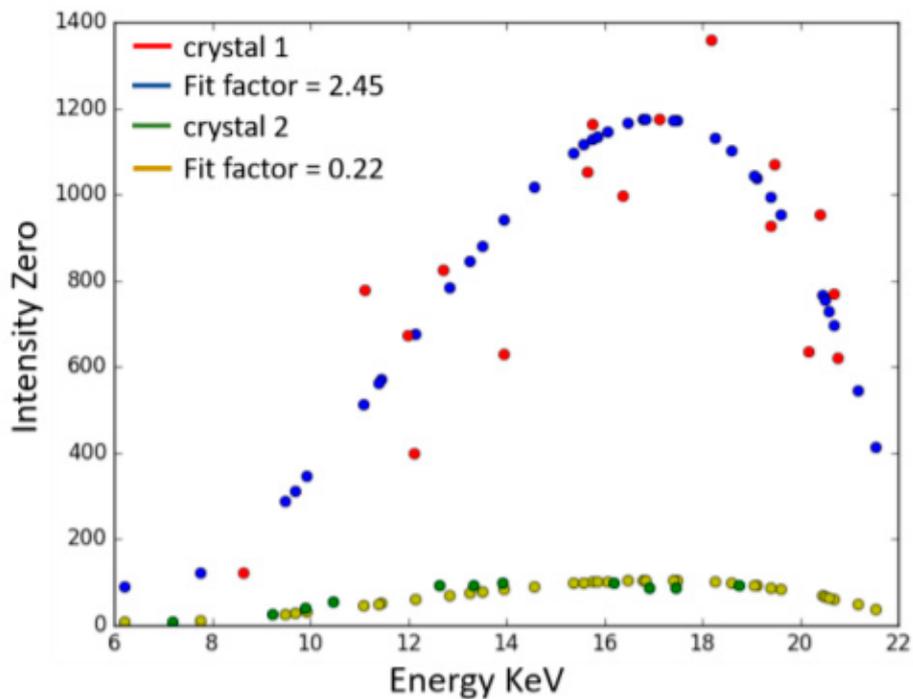


Figure S3. Intensity spectrum of the incident polychromatic X-ray beam superimposed with the intensity of the indexed Laue spots for the two variants of the twinned gold crystal and the energy of the respective diffracted X-rays.



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