

# Characterization of Synthetic Ila Diamonds at SPring-8

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Synthetic Ila diamonds [1] with 111 and 001 surfaces are characterized using rocking curve measurement, quasi-plane wave x-ray topograph measurement, reciprocal space mapping and fluorescent x-ray analysis. The measured rocking curves are comparable to the theoretical expectation. However, the width of the rocking curve is found to depend on sample. From x-ray topograph, the deference relates to density of stacking faults. The reciprocal space maps measured for 111 crystals confirm such a relation and exclude surface effects, such that the damaged layers broaden the rocking curve. The fluorescent x-ray analysis reveals that small amounts of Fe and Co impurities, which are introduced from the metal solvent used for crystal growth, reside near the seed crystal. Comparison with x-ray topograph, these impurities seem to be the origin of some dislocations.

Some problems with surface finish by PCVM (plasma chemical vaporization machining) are also reported.

## Reference

[1] – N. Toda, H. Sumiya, S. Satoh, T. Ishikawa, Proc SPIE **3151**, 329, (1997).