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USING *IN-SITU* MICROLAUE DIFFRACTION TO UNDERSTAND PLASTICITY IN MgO

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The present study investigates the micromechanical modes of deformation in MgO prior to cracking at room temperature. A combination of time resolved white beam Laue diffraction technique and *in-situ* nano-indentation of large single crystal micropillars provides a unique method to study the operating mechanisms of deformation in this otherwise brittle oxide ceramic. Upon indenting an [100]-oriented MgO micropillar, rotation and streaking of Laue spots were observed. From the streaking of the Laue spots, differential slip on orthogonal {110} slip planes was inferred to take place in adjacent areas under the indent - this was consistent with the results from the transmission electron microscopy studies. Upon cyclic loading of the pillar, subsequent stretching and relaxation of peaks was hypothesised to happen due to pronounced mechanical hysteresis commonly observed in MgO. Also, time-resolved spatial mapping of the deformation gradients of the area under the indent were obtained from which the strain and rotation components were identified.