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# Thermally activated deformation in cast aluminium microwires

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## **THERMALLY ACTIVATED DEFORMATION IN CAST ALUMINIUM MICROWIRES**

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**Key Words:** microcasting, single crystal, thermally activated deformation, relaxation testing

We present a study on the thermally activated deformation behavior of aluminium (99.99%) microwires. The wires are prepared through a microcasting process based on a combination of lost pattern casting and pressure infiltration. In this manner microwires with a diameter between 7 and 100  $\mu\text{m}$  can be cast. The wires are monocrystalline, have a surface roughness around 30 nm and are amenable for tensile testing. Their monotonic flow depends strongly on orientation, and displays a large number of stochastically distributed strain bursts. Relaxation tests are conducted on microwires with a diameter between 15 and 100  $\mu\text{m}$ . The relaxations consist of continuous relaxations superposed with discrete strain jumps similar to those found during monotonous straining of the wires, proving that initiation of strain jumps can be thermally activated. Mechanical tests are supplemented with microscopic investigations of the metal substructure evolution that accompanies deformation of the wires.