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Micro-tomographic study of metal grainy structure

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X-ray transmission radiograms of Aluminum alloy contain features induced by variations of the material chemical composition. Generally, material variations are strongly connected with grains of the metal, where the material composition of one individual grain is more or less homogenous. However, material composition varies from one grain to other. Grains of the studied material have typically dimensions 10 micrometers in diameter and 100 micrometers in the length. The material variations can enable the observation of geometry and orientations of individual grains in the specimen volume using a highly sensitive and high resolution detector together with advanced X-ray micro tomographic method. Observation of such tiny structures requires high dynamic range of acquired radiograms with high signal to noise ratio and appropriate geometrical magnification. These requirements can be fully satisfied using single photon counting device Medipix, a precise micro-tomographic setup and appropriate data processing. Results will be demonstrated with Aluminum alloy bar specimen.

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