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**Quantitative Microstructural Analysis of Plutonium Oxalate Decomposition over Time**

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Solid state transformation of plutonium oxalate species has been observed by the authors to occur at room temperature in air. These conclusions are supported by qualitative X-ray diffraction (XRD) analysis, ultra violet-visible (UV-Vis) and attenuated total reflectance (ATR) spectroscopies over several months. However, quantitative characterization of the microstructural changes in these powders provides more specific information regarding the rate of decomposition of the starting material as well as potential intermediate species and the decomposition products that form. Recently, line profile analysis (LPA) has been applied to XRD studies of plutonium oxide to provide crystallite size distributions for the first time. Herein, we present an extension of this modeling method to the study of transient plutonium oxalates to provide quantitative microstructural analysis of this autoradiolytic material.

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