The Pan African Conference on Crystallography (PCCR2)
and
The African Light Source Conference (AfLS2)

Contribution ID: **172** Type: **Oral Presentations**

PZN-4.5PT single crystals and nanoparticles thin Films Characterization using XRD and Synchrotron Light Sources

Tuesday, 29 January 2019 11:45 (15 minutes)

PZN-PT single crystals showed properties up to 10 times more interesting than those of the ferroelectric perovskite materials currently used. However, the greatest difficulty to use PZN-4.5PT single crystals on electronic devices is to achieve them in thin layers form because of their incongruent melting property. In this work we fabricate with success thin films by dispersing these nanoparticles in a gel. The as fabricated thin films showed colossal dielectric permittivity large than 105. However, we found from SEM images the formation of non-identified hexagonal microcrystals, which could be the origin of such excellent properties. These require intensive investigations to identify such hexagonal components and the phase changes in dielectric-temperature characteristic.
Synchrotron light source was used to characterize the influence of manganese doping on the single crystals using XANES spectroscopy at ESRF. Philips X'Pert Pro XRD diffractometer was used to identify the hexagonal microcrystals and the phase changes using temperature chamber coupled to the diffractometer.

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Session Classification: AfLS2

Track Classification: AfLS2 track