

Imaging of individual Eu doped Y₂O₃ sub-microspheres using photoluminescence yield: an application of scanning transmission X-ray microscopy in luminescent materials

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Scanning transmission X-ray microscope (STXM) that combines spectroscopy and microscopy has been widely used to probe the electronic structure of individual nanostructure.[1-3] As in a conventional STXM, the transmitted X-rays can be measured by a photodiode, providing a transmission image. Recently we developed the STXM end station at the SM beamline of the Canadian Light Source (CLS) with the capability of detecting optical photons emitted from luminescent sample. Here we demonstrate the imaging of individual Eu doped Y₂O₃ sub-microspheres using STXM by detecting X-ray excited optical luminescence (XEOL) signal from the sub-microspheres. The morphology of individual Eu doped Y₂O₃ sub-microspheres is well resolved at both Eu M_{5,4}-edge and O K-edge. The XEOL yield or photoluminescence yield (PLY) spectrum can be isolated from a single Eu doped Y₂O₃ sub-microsphere. The implication of the results and further development of XEOL mode in STXM for luminescent nanostructures will be discussed.

References

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