

Abstract Submitted
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Scintillator for low accelerating voltage SEM imaging CHRISTOPHER BOWSER, MARIAN TZOLOV, Department of Physics, Lock Haven University, NICHOLAS BARBI, PulseTor LLC — Scintillators are materials that emit light very efficiently when excited by electromagnetic radiation or charged particles with suitable energy. This property gives them great importance in many applications requiring the detection of high energy particles such as electrons in a Scanning Electron Microscope (SEM). We will present results showing that conventional scintillators such as YAP and YAG have poor emissions at low accelerating voltages due to a top conductive layer. We have developed a thin film ZnWO_4 scintillator with high photoluminescence quantum efficiency of about 60% to increase the signal at low accelerating voltages. We have further integrated the ZnWO_4 scintillator with YAP and YAG scintillators by replacing the conductive layer with a ZnWO_4 film which has enough conductivity to prevent charging. We will compare the spectral intensities over a range of accelerating voltages between 1 and 30kV between the conventional and coupled thin film scintillator. We have quantified the charging effect by measuring the sum of the secondary and backscattered electron coefficients. We have built detectors with the above mentioned scintillators and we will compare SEM images recorded simultaneously by conventional and ZnWO_4 -based scintillators.

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