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Electron Energy Loss Spectroscopy Signal Processing Tool for Materials Research

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ABSTRACT

Allowing scientists to analyze materials' structure and chemistry at an atomic level, the electron microscope has become a vital tool in materials engineering. Due to the inherent nature of signals (inelastic electrons or X-ray) having a low signal-to-noise ratio, processing the signal collected with an electron microscope is frequently required and uses sophisticated computer code. The software written to do this can be very difficult to learn and use. To make these tools more easily accessible to new users, we will create a simple user interface and host it online. Using the Rappture development tool, a menu driven graphical user interface was created for the HyperSpy software package allowing all software commands to be handled automatically. Choosing the Rappture development tool means the interface will also be easily updated to include new functionality as HyperSpy evolves. When completed, this interface will be made available online via the NanoHUB server at Purdue University. This will help scientists analyze materials in a uniform and repeatable manner using a readily available and easy to learn interface.

KEYWORDS

electron energy loss spectroscopy (EELS), signal processing, multivariate statistical analysis, HyperSpy, graphical user interface (GUI)