

High-Throughput Optical Thickness and Size Characterization of 2D Materials

William W. Dickinson, Harish V. Kumar, Douglas H. Adamson, Hannes C. Schniepp

— *Supporting Information* —

ImageJ Macro InvertMountain

Code available at GitHub: (<https://github.com/schniepp-lab/invert-mountain>), and as source file `InvertMountain_v04.ijm`, attached as supporting information.

An ImageJ macro that finds local brightness maxima within an image, determines the maximal area around each maximum in which the brightness decreases, then inverts the brightness in those regions about a pre-determined inflection point.

Tested with ImageJ v1.50b

Instructions for Use:

First, install the macro through use of the `Plugins>Macros>Install...` menu option.

Second, select the image to be processed. The macro will act on the current selection within the image, or the entire image if no selection is made.

Third, execute the macro through the `Plugins>Macros>Invert Mountain Tool` menu option. This will generate a window with several parameters available for modification:

Inflection Point: The brightness value that the inversion occurs about. Correlates with the value at which the brightness-vs-layer number relationship inverts.

Maxima Noise Tolerance: Minimum amount by which the brightness of a maximum must exceed the surrounding area. Must be ≥ 0 .

Exclude Edge Maxima: If `true`, a peak is only accepted if it is separated by two qualified valleys. If `false`, a peak is also accepted if separated by one qualified valley and by a border.

Flood Noise Tolerance: Maximum value by which the brightness of neighboring pixels may exceed the brightness of the pixel being examined. Prevents noise in the image from prematurely terminating the mountain.

Sanity Threshold: Pixels above this brightness value are automatically included in the mask. Prevents exclusion of “obviously inverted” points due to greater noise than expected. For analysis of layered materials, this should be above substrate value by a brightness corresponding to at least one layer.

Fill Holes: If `true`, areas fully enclosed within a region that has been identified as part of a mountain will be added to the region before inversion occurs.

Finally, after adjusting all parameters to the desired values, press the `OK` button, and the macro will act on the image.

Processed images of GO samples

Representative optical images of each of the three samples of GO are provided here. The gray and false color brightness scales are the same across the three sets of images.

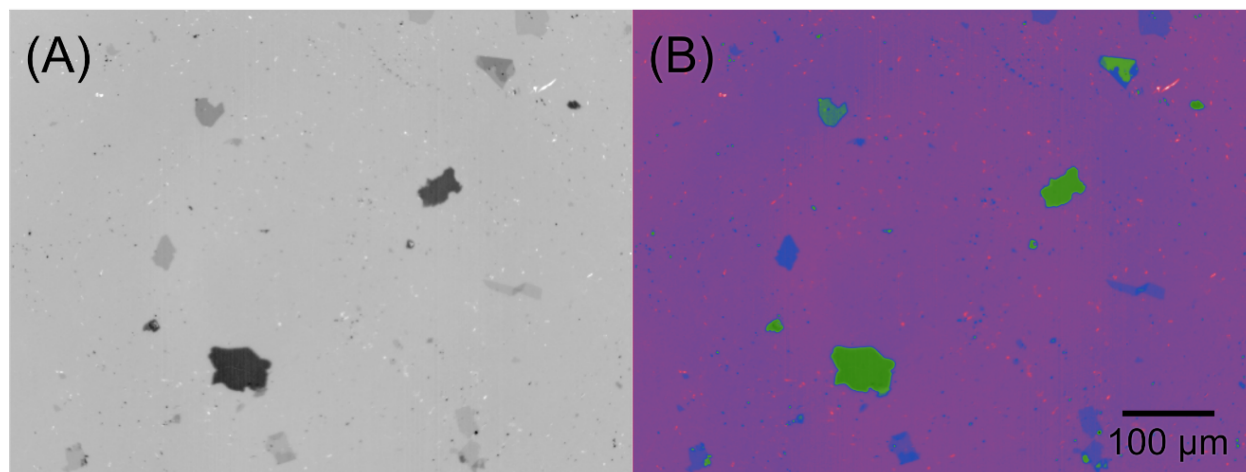


Fig. S1 Sample optical image of the GO sample in grayscale (A) and false color (B).

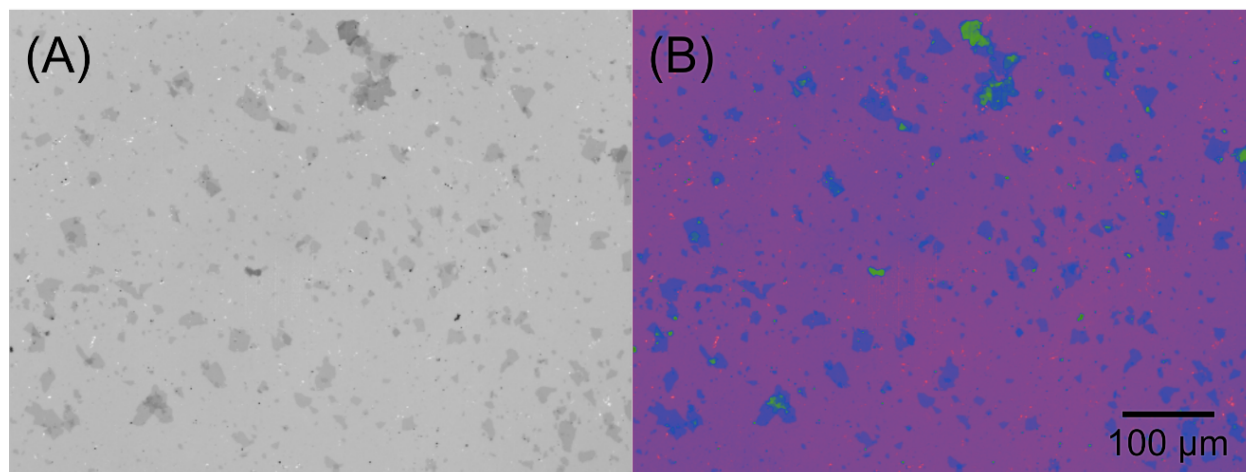


Fig. S2 Sample optical image of the GOe sample in grayscale (A) and false color (B).

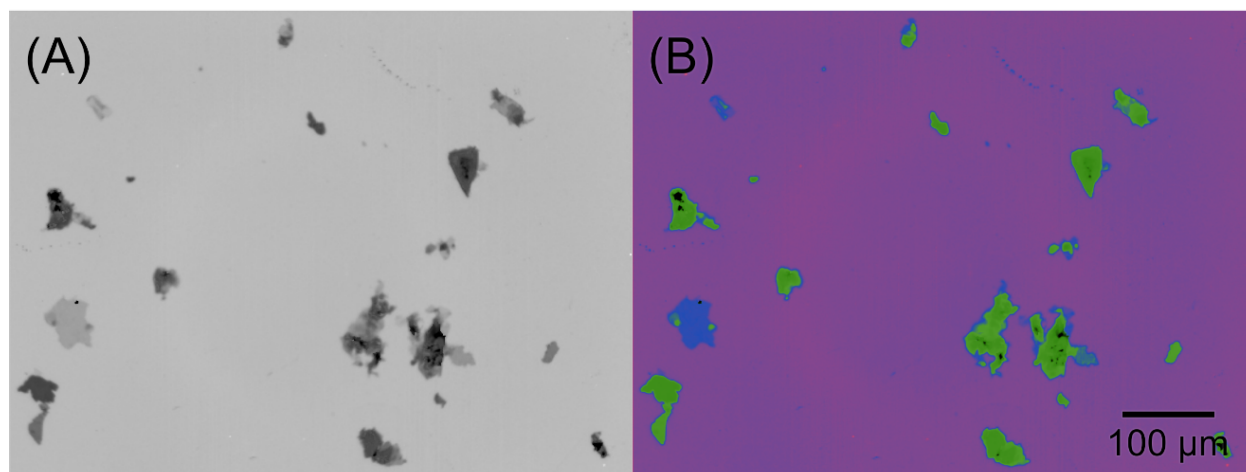


Fig. S3 Sample optical image of the GOW sample in grayscale (A) and false color (B).