Alpha, Borides, Beta segmentation of FIB Serial Section Dataset of Ti Alloy with Borides

**Details of the recipe steps:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Step** | **Name** | **Purpose** | **Sensitive to spatial resolution** |
| 1 | Reference | Reference image |  |
| 2 | Non-Local Means Filter | This step allows to denoise the image |  |
| 3 | Convert Image Type | Conversion to 16 bits for the following step |  |
| 4 | Image Gradient | This step allows to get a representation of objects boundaries | Yes |
| 5 | Convert Image Type | Conversion back to 8 bits |  |
| 6 | H-Minima | This step allows to get local minima from the gradients image. These minima will be used as seeds in the watershed step |  |
| 7 | Labeling | Get one label per set of connected pixels |  |
| 8 | Reference Change | Change reference to Image Gradient from step 3 |  |
| 9 | Marker Based Watershed | Generates watershed basins from the seeds calculated at the previous step and the gradient image used as a landscape. |  |
| 10 | Expand Labels | Expand labels to fill the entire image and avoid boundary voids |  |
| 11 | Filter by Measure Range | Filter basins in between a certain range of their mean of intensities to extract the phase corresponding to Beta. The Denoised image from step 2 is used as intensity image for calculating means |  |
| 12 | Thresholding | Threshold the previous result to generate a binary image |  |
| 13 | Binary smoothing | Smooth preceding mask. **Beta is finalized.** |  |
| 14 | Reference change | Reference change to Expand Labels from step 8 |  |
| 15 | Filter by Measure Range | Filter basins in between a certain range of their mean of intensities to extract the phase corresponding to Borides. The Denoised image from step 2 is used as intensity image for calculating means |  |
| 16 | Thresholding | Threshold the previous result to generate a binary image |  |
| 17 | Binary smoothing | Smooth preceding mask. **Alpha is finalized.** |  |
| 18 | Reference change | Reference change to Expand Labels from step 8 |  |
| 19 | Filter by Measure Range | Filter basins in between a certain range of their mean of intensities to extract the phase corresponding to borides. The Denoised image from step 2 is used as intensity image for calculating means |  |
| 20 | Thresholding | Threshold the previous result to generate a binary image |  |
| 21 | Binary smoothing | Smooth preceding mask. **Boride is finalized.** |  |
| 22 | Image Arithmetic | Sum up alpha, beta and borides to have all phase in one label |  |