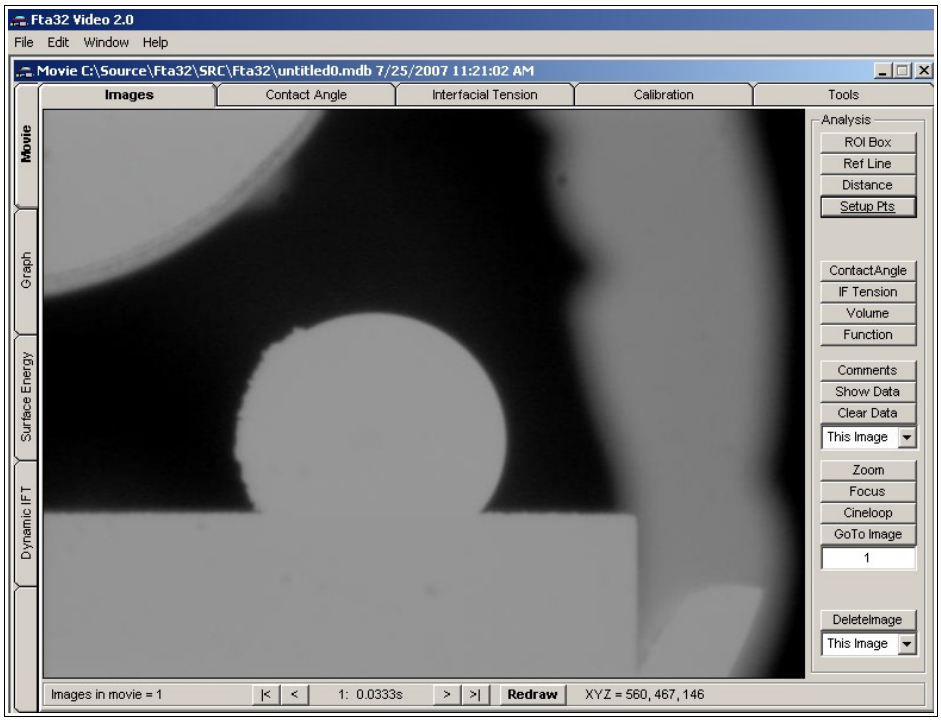
First Ten Ångstroms

Processing Hot Metal Images

25 July 2007

The following image was taken with an FTA long range microscope kit. It shows molten metal on a substrate in a furnace. The object is to measure the contact angle. Notice the image is "reversed" in that the drop is bright against the background. This is normal for hot specimens.



Original image of molten drop.

The first thing we do is use the ROI (region of interest) box to establish a region in the image in which we will work. Then we will use the silhouette function to make this a binary image. These images are shown on the next page. Then we will smooth the image. Sometimes additional smooth-only operations are necessary. Both silhouette and smooth image options are check boxes on the Tools tab. They are executed when you click Function on the Image tab. The setup screens for the image processing functions and the subsequent contact angle analysis are on the page after the images.

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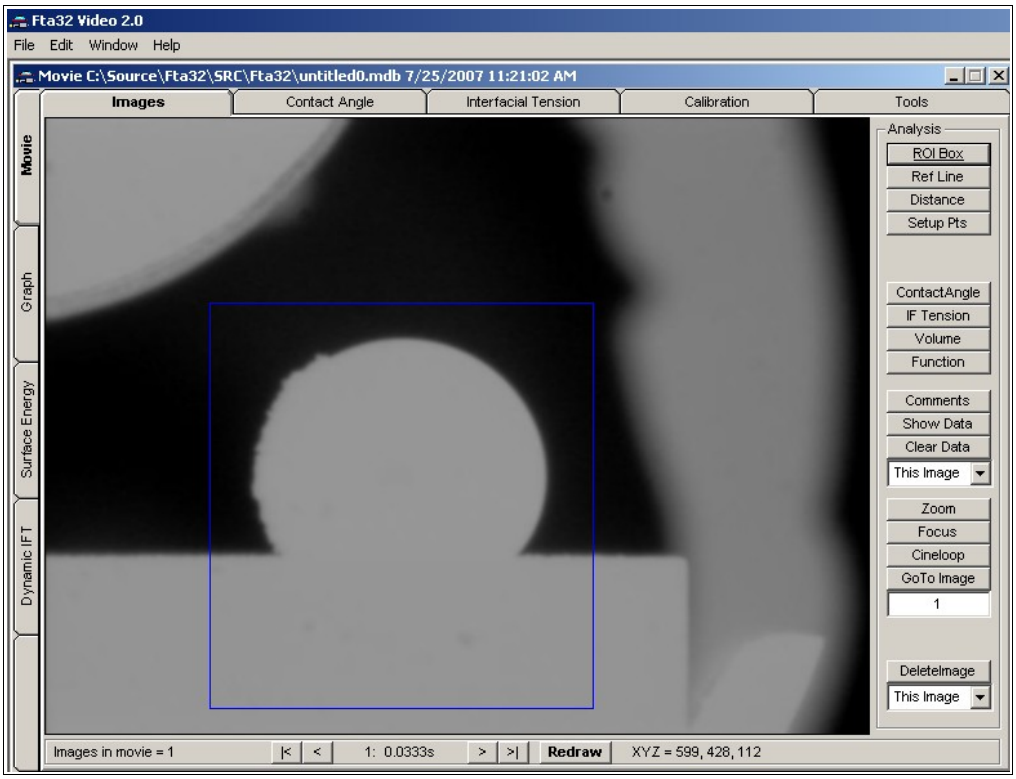
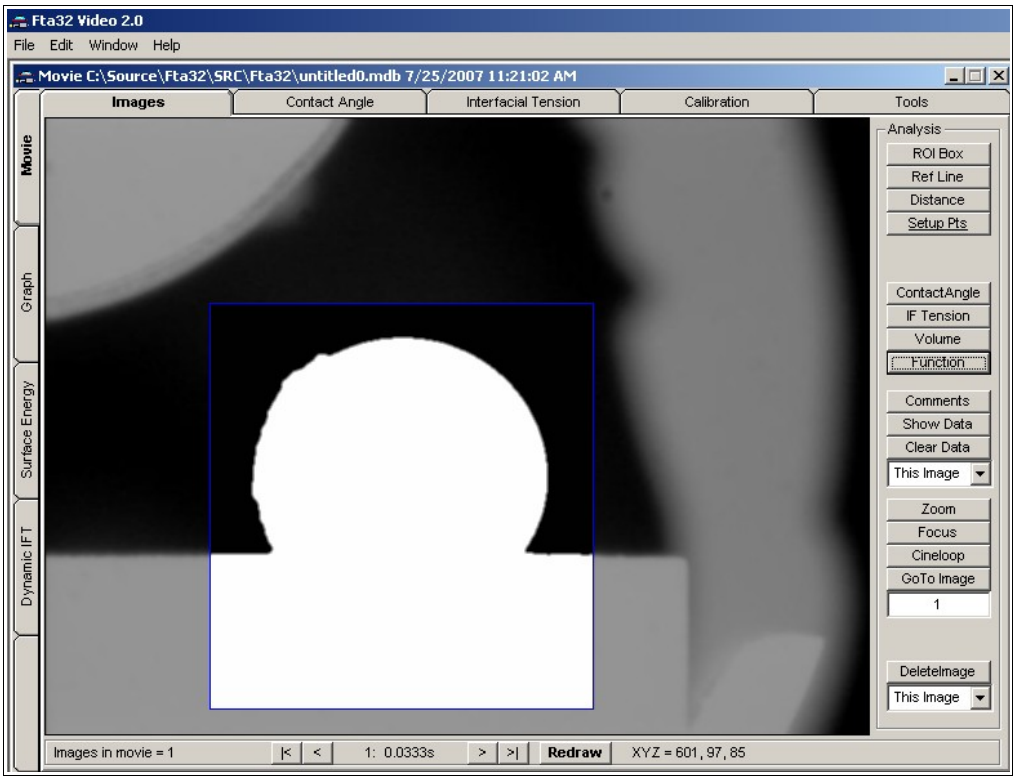
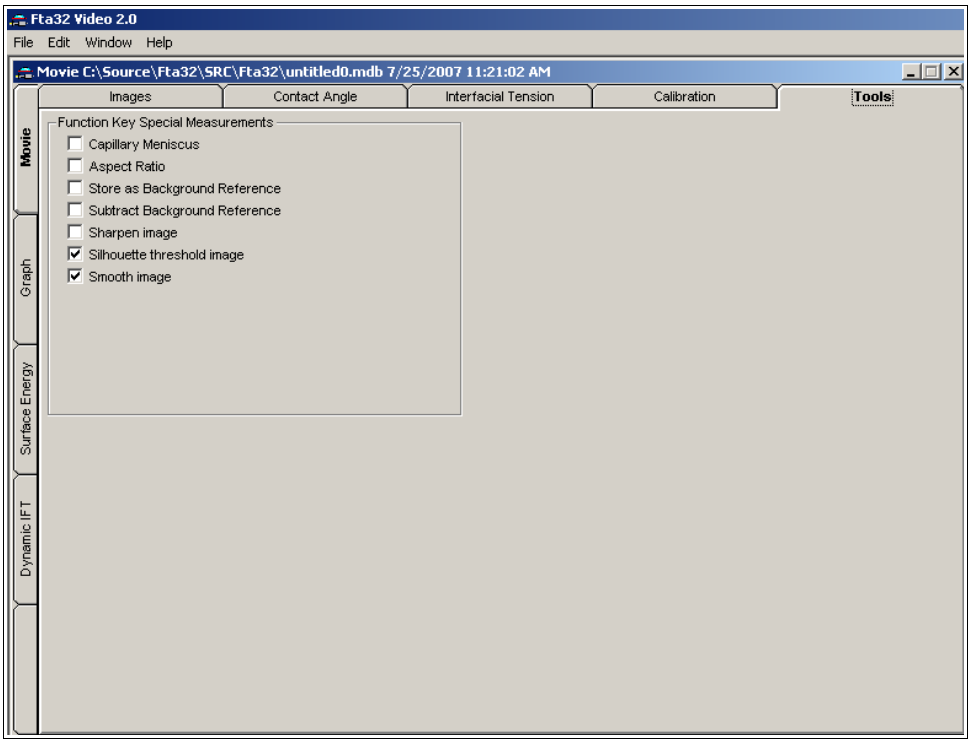


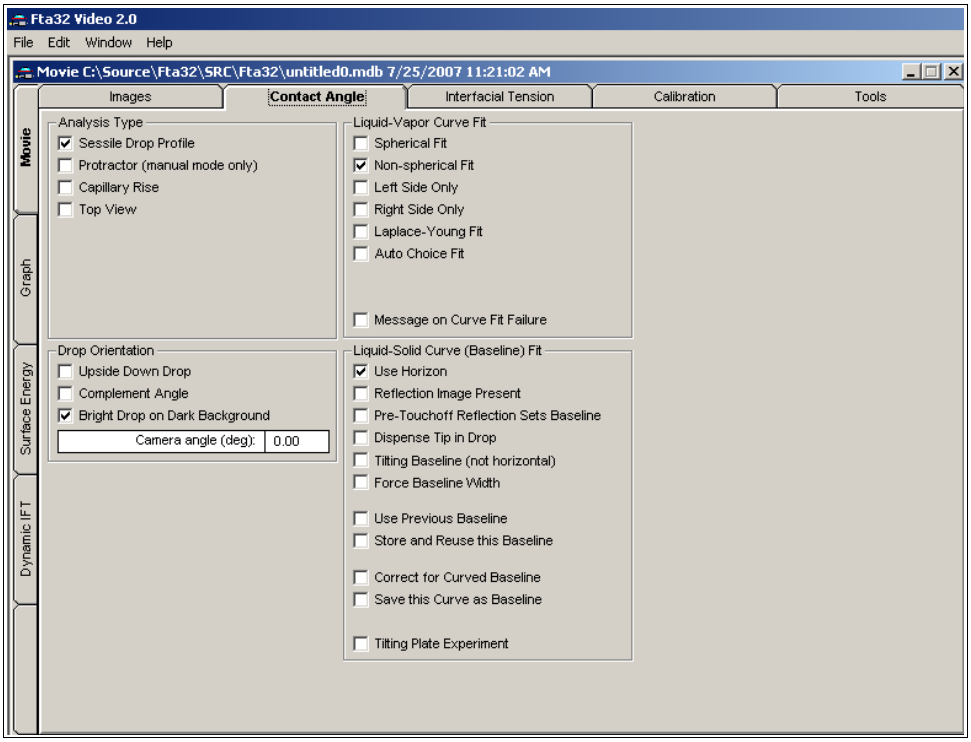
Add a region of interest with the ROI tool and mouse clicks in image.



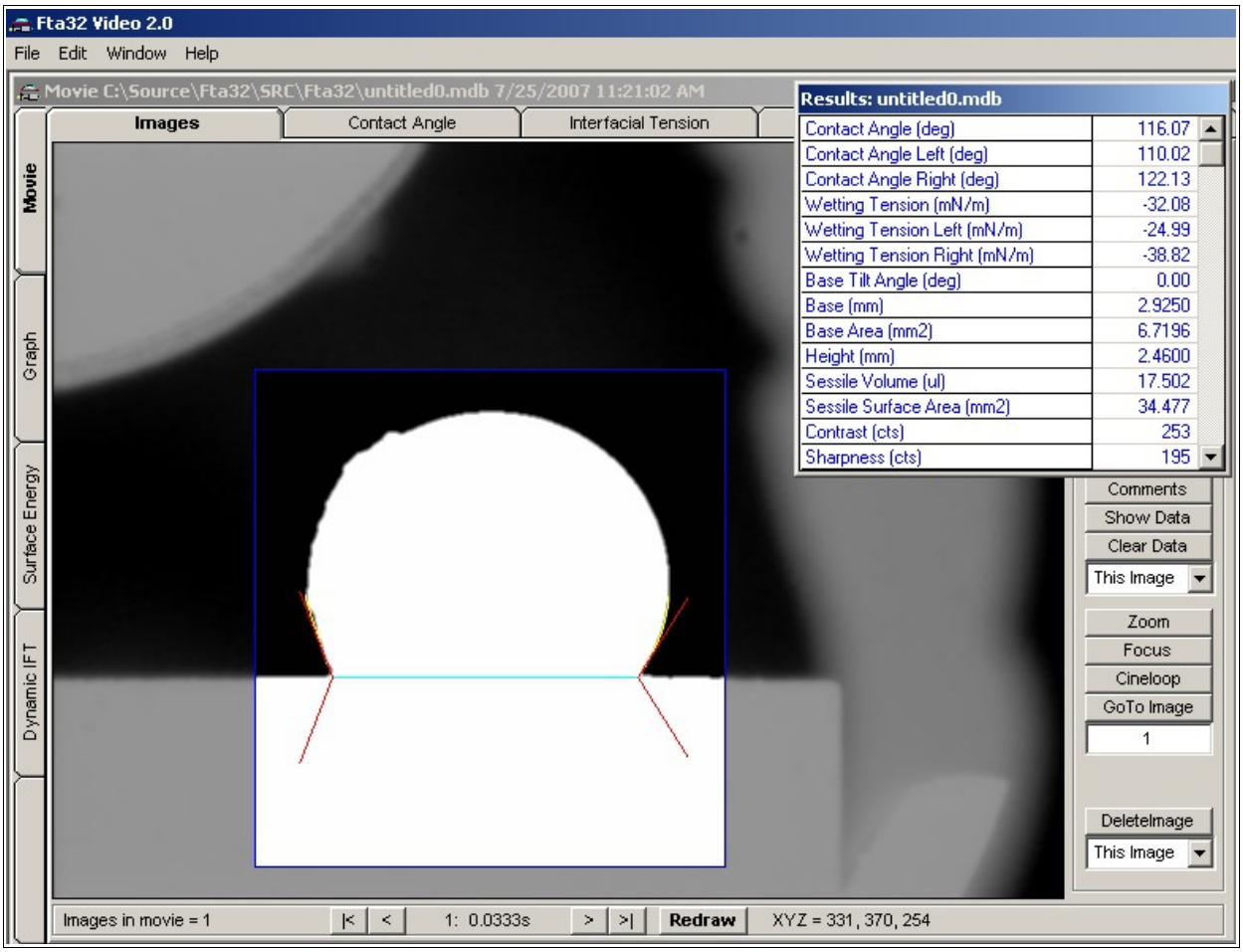
Apply image processing operations with Function tool.



Selection of image processing operations for the Function tool. Sometimes you may wish to use only Smooth Image to help deal with rough spots on the drop.



The most important choice is Bright Drop on Dark Background. This is necessary. This image has a clear horizon-type baseline, which makes image analysis easier. We chose non-spherical because the drop was large enough to be distorted by gravity.



Contact angle analysis for the image. This is completely automatic. We used non-spherical analysis because the drop was distorted by gravity. Notice these drops are often imperfect – see the rough spots on the left-hand side. This can sometimes force you to use spherical mode because no good fit can be obtained near the three-phase (wetting) point.

File: ProcessingHotMetalImages.doc