

A simple strategy to make center stops for x-ray microscopy

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Overview: to make a center stop, a gold ball with appropriate diameter will be glued to a silicon nitride window. Using the strategy described below, a center stop with diameter down to 25 microns can be made.

Spread the gold balls to a glass slide. Have them being distributed as dilute as possible so that individual ball is visible. A human hair turns out to be quite effective to move the particles around. (Other flexible thin fiber should work as well.) Search for desirable gold balls via optical microscopy. The difficulty is to mark the desirable balls since the objective lens (50X) may be too close to the gold balls. The trick here is to have the desirable ball well separated from adjacent gold balls so that you can identify it from low-magnification objective lens (10 X) or even by eyeball.

The next step is to have the ball glued on the silicon nitride window. Have a droplet of glue near the center of the silicon nitride window. Pick up the desirable gold ball using the human hair (clean any existing gold balls by kimwipe before doing this) and transfer it into the glue. One can confirm whether the right gold ball was picked via optical microscopy and check whether the ball has been transferred successfully. Once the glue gets dried, a center stop is finished. Keep it with the container you like and then it is time to clean up the microscopy and the rest of gold particles.

- Gold balls: Alfa Aesar, part # 43901 (Gold powder, spherical, - 200mesh, 99.9%)
link: <http://www.alfa.com/en/GP100W.pgm?DSSTK=043901&rnd=554038347>
- Si₃N₄ window: Norcada Inc, part # NX5150C (Frame Size 5 mm sq. 200 microns thick; Window Size 1.5 mm sq. 100 nm thick)
link: http://www.norcada.com/nitride_window_xray.php
- Glue: any general superglue would be fine.