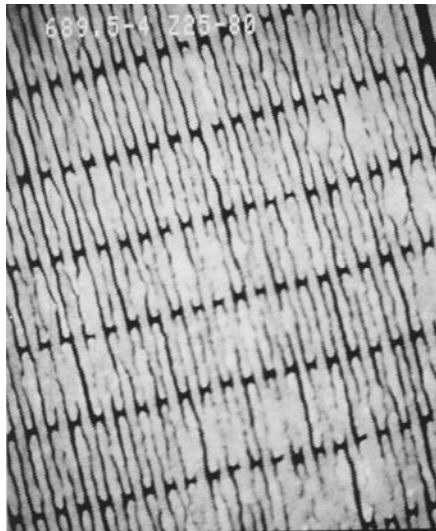


# Xradia's Path To 25-nm X-ray Zone Plates For Hard X-ray Imaging

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We present the latest results on Xradia's effort towards high-resolution, high aspect ratio gold zone plates for x-ray focusing and imaging applications. Recent successes include the fabrication of zone plates of 40nm zone width and with 700nm Gold zone height and zone plates of 25nm zone width and with 200nm Gold zone height.

Fabrication of zone plates for hard x-ray applications is very challenging because it requires fabricating nanometer scale fine structures with a thickness many times of the feature size. For example, producing 25-nm resolution x-ray zone plate with optimal focusing efficiency for 8 keV x-rays would require a thickness about 1,600 nm, which is about 80 times the smallest zone width of 21 nm required for 25-nm resolution. Currently, generating zone plate patterns with the required zone width and registration can be achieved by many commercial e-beam lithography systems. The limiting factor in making high-resolution zone plates for hard x-ray imaging using this technology is the transfer of these structures into high aspect ratio structures made out of a high-Z material such as gold. In the last few years Xradia has refined a tri-level process scheme to fabricate zone plates with outstanding efficiency and resolution for hard x-rays. We will report the latest results of our zone plate fabrication capabilities.



Outermost zones of a Gold zone plate with 25nm outermost zone width and 200nm Gold height fabricated for Xradia's nano-XFI x-ray fluorescence imager.