Docket #: S18-480

Flexible X-ray Gratings for X-ray differential phase contrast (DPC) imaging systems

Stanford researchers at the Hasselink Lab have developed a method for making a high aspect ratio phase grating structures on a substrate that can be curved to better meet the optics requirements in X-ray differential phase contrast (DPC) imaging systems.

DPC is different from traditional X-ray imaging since it provides three different outputs (attenuation, phase contrast, dark-field) instead of one, and can improve detection of unknown materials with improved image contrast. Traditionally, high aspect ratio gratings are made with X-ray lithography and LIGA process, which requires synchrotron radiation X-ray sources. In contrast, this process is more simple and fully compatible with silicon semiconductor processes, thus easier for mass manufacturing with lower costs.

The team tested its prototype with X-ray DPC imaging and demonstrated enhanced field-of-view (FOV) and improved image qualities.

Figure

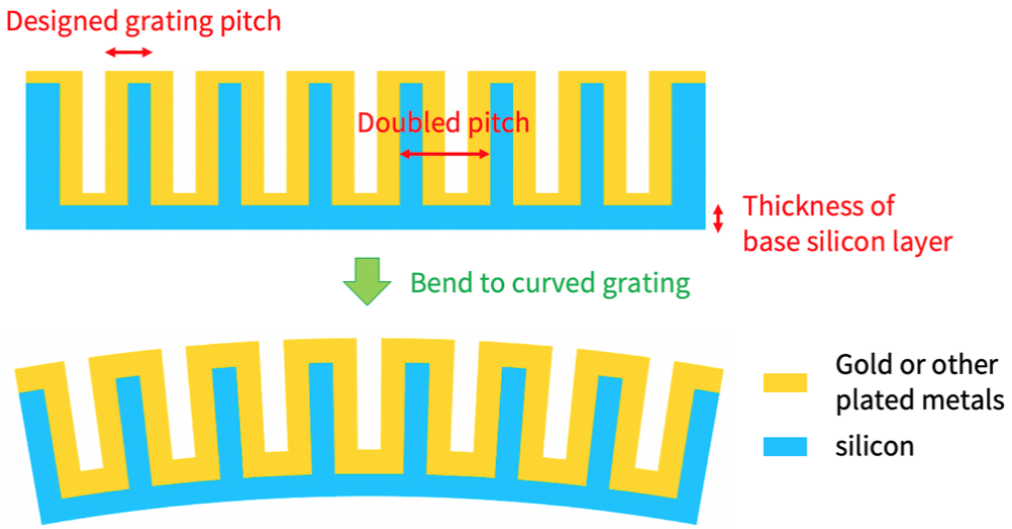


Figure description - Illustration of X-ray grating with a flexible thin base silicon layer

Stage of Research

- Prototype tested

Applications

- **X-ray baggage scanning**
- Homeland Security
- X-ray differential phase contrast (DPC) imaging system or other X-ray interferometers that require X-ray grating

Advantages

- **Higher field-of-view**
- Improved detection of materials
- More enhanced images due to tri-signature imaging mode
- Compatible with silicon semiconductor processes, thus easier for mass manufacturing with lower costs

Patents

- Published Application: 20200222017
- Issued: 11,116,463 (USA)

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