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Presenting Author: Bob B. He
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  Retractable Knife-edge for XRD Combinatorial Screening
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Address:
  Bruker Advanced X-ray Solutions, Inc.
  5465 East Cheryl Parkway
  Madison, Wisconsin 53711-5373 USA
  Phone: (608)-276-3086
  Fax: (608)-276-3015
  E-mail: bhe@bruker-axs.com

I intend to publish this paper in the conference proceedings, Advances in X-ray Analysis, Volume 47.
In the low angle diffraction in reflection mode, the incident x-ray beam spreads over the sample surface into an area much larger than the size of the original x-ray beam (defocusing effect). In combinatorial screening applications, sample cells are located close each other. Therefore, the spread beam may cause cross contamination in the collected diffraction data. So that it is necessary to use a knife-edge to limit the diffraction area. The conventional knife-edge is typically mounted on the sample stage, while combinatorial screening requires that the knife-edge to be mounted on a separate stationary base so that the knife-edge does not move with sample.

A motorized retractable knife-edge (patent pending) used for x-ray diffraction screening for combinatorial library at low Bragg angle range is introduced. The knife-edge can reduce the defocusing effect for low angle diffraction in reflection mode. It can eliminate the cross contamination between adjacent cells in the materials library by controlling the size of the diffracting sample surface. The retractable knife-edge is mounted on the stationary base independent of the sample translation stage so that the knife edge stays at the same aligned position while each cell of the combinatorial library moving into the x-ray diffraction measurement position. The retractable knife-edge can be driven into two positions, retracted position and extended position. The retracted position allows each cell to be aligned to the instrument center by a laser-video alignment system. In the extended position the knife-edge collimates the x-ray beam for low angle diffraction. The motorized retractable knife-edge makes it possible to scan over the whole combinatorial library with automatic sample alignment.