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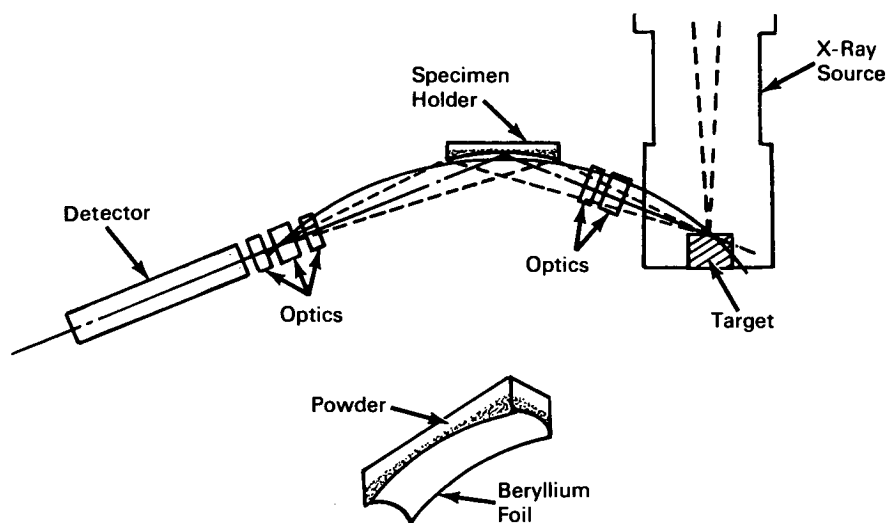
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NASA TECH BRIEF



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Specimen Holder Design Improves Accuracy of X-Ray Powder Analysis



SPECIMEN HOLDER DETAILS

The problem:

In X-ray diffraction analysis, a specimen supported in the path of X-rays reflects X-rays at angles determined by the spacing between planes of a crystal and the interplanar spacings are used for identification of specimen composition. A flat specimen surface causes an asymmetrical broadening of the line profile and a shift of its peak and centroid.

The solution:

A holder designed to present the specimen to the incident X-rays in a curvature. This permits the use of an X-ray beam having a larger divergence angle, the intensity of the beam is increased, and the statistical

accuracy of analysis is improved approximately proportional to the square root of the intensity. In this way, time for an accurate analysis measurement is appreciably decreased.

How it's done:

The specimen holder is a trough with inwardly curved bottom surface. The sides are flat and a curved portion, machined to the desired configuration, forms an open bottom to which a thin beryllium foil (0.05 mm) is cemented. The beryllium foil serves as the guide surface for the powdered specimen. The X-ray absorption and reflectance characteristics of beryllium foil are well known and are readily calculated within the specimen analysis.

(continued overleaf)

Patent status:

Title to this invention (covered by U.S. Patent No. 3,148,275) has been waived under the provisions of the National Aeronautics and Space Act (42 U.S.C. 2457 (f)) to the North American Phillips Corporation, Briarcliff Manor, New York, 10510.

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