

The most common design for grazing angle specular reflection accessories is to use two large mirrors to reflect the beam to and from the sample. This configuration is shown in Figure 1, for a typical infrared spectrometer. Note in this design:

1. Some of the beam by-passes the mirrors, resulting in a less than optimal situation.
2. Some rays are above the sample. This makes it impossible to design a purge enclosure with further reduction in the radiation interacting with the sample and also limits the maximum sample size.
3. The reflectance of a front surface Al mirror is <70% for p-polarization.
4. This is usually used with a wire grid polarizer to supply the preferred p-polarization.

The alternative design that we offer for the Refractor2 utilized wedged windows to direct the beam, as shown in Figure 2. Of note in this design is:

1. Virtually the entire infrared beam is deflected to and from the sample.
2. The height of the sample is above the beam, so the beam can be enclosed for purge and the sample size is limited only by the sample compartment width.
3. The transmittance of the BBAR coated ZnSe wedged windows is >90%.
4. The design has sufficient space under the sample to build in a polarizing plate, which is more affordable than most infrared polarizers, and results in a compact design.

The only real limitation of the Refractor2 is the spectral range of the windows used. But alternative windows can be used as allowed within the constraints of the design.

Based on the considerations above, the wedged-window design of the Refractor2 will give better performance than the two-mirror design.

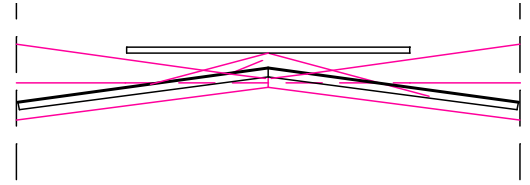


Figure 1. Schematic of a typical grazing angle specular reflectance accessory using the two-mirror design.

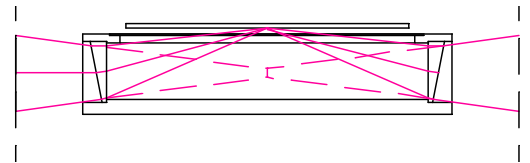


Figure 3. Schematic of a typical grazing angle specular reflectance accessory using the wedged-window Refractor2 configuration.