

Diamond anvils: Which grade? Which size? Which shape? Which seat?

Reinhard Boehler^{1*}

¹*Oak Ridge National Laboratory*

Keywords: diamond anvils

*e-mail: boehlerr@ornl.gov

Making a choice on which kind of diamond anvil to choose among an overwhelming amount of options is often difficult, especially for the not so experienced.

I describe some of the options and their pros and cons for most applications. These include “standard” and single-crystal X-ray diffraction, Raman spectroscopy, ultra-high pressures and Neutron diffraction. Natural or synthetic diamond? What are the advantages and disadvantages of conical anvils? Carbide or steel seats? Bevel types. How can you minimize your cost? What is the future of CVD diamonds?

An improved version of conical anvils is presented with higher stability in the absence of glues. The geometry has been tested at forces exceeding one ton. The anvil is metal swaged, providing high stability and allowing heating. The steel seat has diffraction angles of at least 80 degrees.

New developments for large volume diamond anvils are also described. With “standard” culet sizes of 2mm, pressures of 50 GPa can now be routinely reached. The samples are large enough to provide neutron spectra within minutes and fully refinable spectra in just a few hours. This technique has other applications such as X-ray spectroscopy and material synthesis.

