Almax·easyLab
science under pressure

Application Note

Bragg-Mini vs Diasqueeze: So similar and yet so different !

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The Bragg-Mini and the Diasqueeze can often be confused as two twin sisters, but when one looks closer they are quite different when one knows where to look.

The Bragg-Mini and The Diasqueeze are, both, small diamond anvils cell that consist of two triangular plates linked together by three guiding posts. However, the similarities between these two DACs should not hide the fact that their purpose and use are very different. That is what we explain in this technical note.

Different pressure range and different applications

Diacell® Diasqueeze

The **Diasqueeze** plates are held together by three thumb spring loaded screws. The press, designed to be used **in the kbar pressure range (~ 1kbar range**), is mainly a micro-sampling device, to be used for analytical studies such as finding the chemical composition of materials. This miniature press has the advantage that it can easily squeeze the samples to a correct thickness for a maximum spectral definition. Moreover, the sample interfacing with the diamond anvils eliminates any air or voids which could distort an analytical spectrum. The cell is suitable for, both, FTIR and Raman measurements and it doesn't alter the sample, this latter remaining chemically unchanged and retrievable for further analysis. For this reason this press is preferred by the forensic type analysis.

Diacell® Bragg Mini

The **Bragg Mini** is a Merrill-Bassett type, high pressure diamond anvil cell (DAC). Almax easyLab has engineered this DAC to accommodate Boehler-Almax anvils. Unlike the Diasqueeze press, this DAC can generate very high pressure of **several tens of GPa**. The sample is located in a small hole drilled in a disk (the gasket) and surrounded by a liquid pressure transmitting medium. The Bragg-Mini plates are pulled towards one another with three socket clamping screws providing the pressure mechanism. On the lower plate, are precisely mounted guiding rods, along which the upper triangular plate is guided to ensure a smooth displacement. The very smooth and tight fit between the plates ensures the stability of diamond anvils alignment.

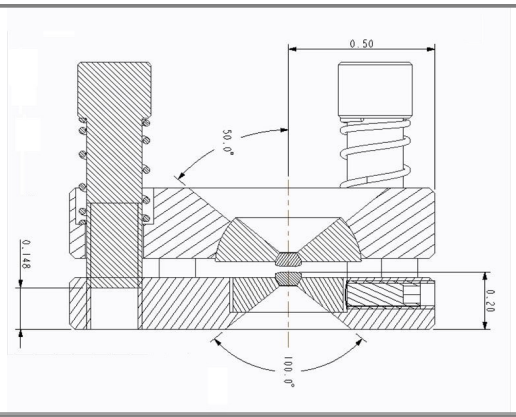
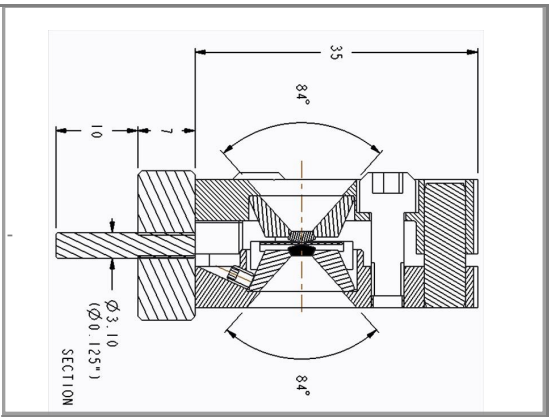
While the Diasqueeze is used typically to find the chemical composition of materials, the Bragg-Mini is used to define the chemical structure of a material by the mean of X-ray or Raman measurements. But, more importantly, the Bragg-Mini is used to study the materials behaviour at very high pressure. Depending on the culet size of the diamond anvil the Bragg-Mini can routinely achieve pressures of 20 GPa.

Different anvils for different pressure ranges

The **Diasqueeze** is fitted as standard with high purity **Type IIas** diamond anvils, 2.30 mm Boehler-Almax design, **8 - sided** and with **0.80 mm** culet size. The big culet offers enough sample space and the Type IIas anvils enables IR measurement but also if required Raman measurements with very minimal background signal.

In the case of the **Bragg-Mini**, the DAC is fitted with **16-sided 3.30 mm Boehler-Almax** design anvils, (usually natural **Type Ia** diamond anvil for X-ray measurements or **Type IIas** synthetic diamonds for IR or demanding Raman measurements). One can also choose in a large choice of anvil culet sizes, ranging from **0.30 to 1.20 mm** depending on the pressure range required.

A peek inside the Diasqueeze and the Bragg-Mini

		
	Diacell® Diasqueeze technical cross section	**Diacell® Bragg Mini technical cross section**
Sample space	Directly between the two diamond anvils (no gasket)	Contained in the gasket hole (Stainless steel , 0.250 mm thick)
Pressure/force transfer	Directly by the two opposed anvils	Quasi-hydrostatic liquid pressure transmitting medium
Maximum Pressure	1 kbar range	>20 GPa
Pressure Mechanism	Screw or finger tight	Screw – driven
Cell Material	AISI 316	AISI 316
Anvil Support Plate	Tungsten carbide	Tungsten carbide
Diamond anvil	8-sided, 0.80 mm culet , type IIas, 2.30 mm Boehler-Almax design	16-sided, 3.30 mm Boehler-Almax design various culet sizes
Top/Bottom Angles	100 ° Conical	X-ray: 85° Conical
DAC diameter/ DAC Height	< 38mm (triangular) / 13 mm	< 43mm (triangular) / 15 mm
Working Distance to Sample	5 mm	7.5 mm
Weight	~ 70 g	~ 100 g
Numerical Aperture	0.78	0.68
Interface with spectrometer	FTIR interfacing plate	Interfacing plate and mounting pin