

## LOW VOLUME SAMPLING CELLS

Comparing CD with other techniques such as NMR a clear well known advantage is the call for limited sample volume and low concentration. A good example is CD of biological samples such as proteins and peptides: in the low UV range, where most of the information are: CD is really an appealing technique in this respect.

Even in these cases however if we move to the near UV range, where from additional information can be extracted, sample volume and concentration may become problematic.

Dealing with expensive and/or limited availability samples may be a problem when 10mm or longer path cells are required. With normal cylindrical cells (19mm int. Ø) you need 300µl/mm and with rectangular cells about 120µl/mm.

In regular UV-VIS spectrophotometry semimicro cells (4 or 2 mm internal width) are often used when sample volume is limited. Semimicro cells can be used in CD too, providing the unit has beam focus in the center of the compartment or equipping the unit with a mild beam condenser. But to avoid artifacts sampling beam should be as parallel as possible, furthermore the potential birefringence effects in semimicro cells are much higher.

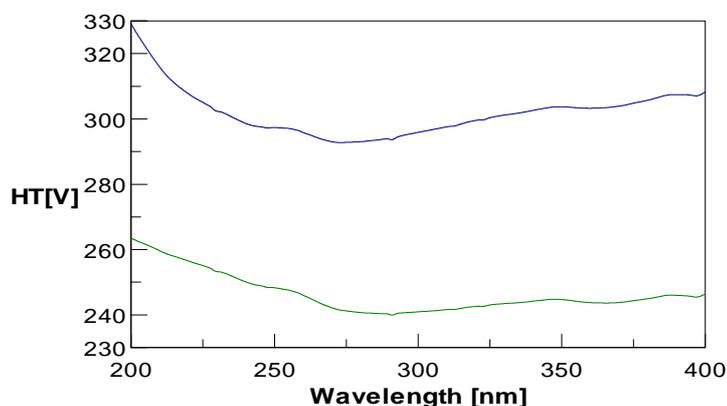
So the use of limited sample volume cells calls for more attention than in normal absorption spectroscopy, a few possible solutions are listed here:

### *-for 10mm path cells*

Jasco had been offering since many years a micro attachment (lens type beam condenser) for the strain-free MAC-10 100µl volume/10mm path cylindrical cell. A similar holder is available also for rectangular cells (with potential limitations outlined above).

The MAC-10 cell can be used also *without* beam condenser, fitted in a dedicated holder or inserted in a standard Peltier cell holder.

Despite the fact that without beam condenser a wide part of the beam is not used, performances are not so bad; the HT plots below refer to the empty cell holder without cell and with MAC-10 fitted.



If we use tables of T.R. N° 61 we can quantify that the cell without beam condensing device will waste about 80% of the incoming light, but since 12 times lower sampling volume is required a global benefit is obtained.

### *-for 50mm path cells*

In some cases sample concentration itself is also very low, so best approach calls for the use of longer path cells. Probably best choice here is to use polarimetric semimicro quartz cells (3.5mm inner diameter), which are available also in water jacketed form. Using two 3mm Ø black masks at entrance and exit of the cell will effectively avoid light reflections in the cell walls. These cells will require only for 0.5ml sample volume.