

# Sample preparation guide for the referenceless quantum efficiency measurements.

## *Solid state films:*

1. Sample size should not exceed 1"x1" (25mm x 25mm)
2. Maximum sample thickness (substrate + material) - 2 mm. There are no minimum thickness restrictions. But make sure that you can handle the sample without breaking it.
3. Sample substrate should be transparent at the excitation and emission wavelengths. We can *estimate* the emission efficiency of materials deposited on absorbing substrates, but we can not guarantee accuracy of results.
4. Light emitting material should be attached securely to the substrate surface or encapsulated into transparent matrix. **NO FREE-STANDING POWDER SAMPLES, PLEASE.** If your sample contaminates the integrating sphere, you'll be charged for the sphere recoating.
5. Samples should be of optical quality (i.e. optically homogeneous, without scattering inclusions).
6. Side of the substrate coated with fluorophore should be marked clearly.

## *Liquid samples*

1. Samples should be placed into cuvettes with 1 mm optical path length. Several cuvettes are available at OCF or you can purchase them at Starna Cells (Part # 21-G-1, 21-Q-1, 21-I-1). Quartz cells are recommended, especially for UV range measurements. Make sure that your cuvettes are cleaned thoroughly prior to use.

## *General requirements (what you need to know before you start)*

1. Measure the absorption spectrum of your sample. Identify the excitation wavelength (Ar-ion emission lines 351 nm, 363 nm, 457 nm, 476, and 488 nm are available on a regular basis, other lasers (He-Cd, DPSS) are available only upon request).
2. Measure the emission spectrum using the excitation wavelength determined in step 1. Save it in ASCII format.
3. Measure absorption of the *sample intended for measurements* with highest possible accuracy (if it's not done in step 1). For liquid samples reasonable accuracy is 0.001 OD. For thin film samples it is usually worse than 0.01 OD. Sometimes it is impossible to measure the absorption accurately in reflective films. In this case, contact the OCF staff.
4. Make sure that absorption of you sample is at least 0.1 OD at the excitation wavelength. Otherwise, results of quantum efficiency measurements may be inaccurate.
5. Measurements described in steps 1-4 can be done at OCF. Labor and instruments recharges may apply.
6. Print the spectra measured in steps 2-3 and bring them along with your samples to OCF.
7. If your sample is air-sensitive, please let us know in advance and we will set up a nitrogen/argon purge option for the integrating sphere.