

Protocol for Preparing a Dispersion of SWCNT for Fluorimetric Analysis

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- Prepare a 1% by weight solution of SDBS (sodium dodecylbenzenesulfonate) in DI H₂O or in D₂O. (Use D₂O to make spectral measurements at wavelengths beyond 1350 nm, where H₂O begins to absorb strongly).
- In a small glass container (such as a scintillation vial), add ~10 micrograms of raw solid SWCNT material per mL of SDBS solution. (the quantity of SWCNT is not at all critical)
- Using a immersion tip ultrasonicator (with ~3 mm diameter tip), agitate the mixture at a power level of ~5 to 10 W. Place a water or ice bath around the container to prevent excessive heating. Optimal sonication time will vary with the type of sample and application. The liquid should begin to turn gray within seconds as nanotubes disperse, and it should continue to darken as the dispersion process continues. Excessive sonication may cause undesired shortening and/or damage to nanotubes.
- After dispersion, add a drop of NaOH solution to prevent acid-quenching of the SWCNT fluorescence. Fluorescence should be readily measurable from the sample at this point.
- Undispersed solids or visible small particles may remain after ultrasonic treatment. If their removal is desired, the sample can be subjected to moderate centrifugation at ~10,000 x g. This should give a supernatant layer free of visible particles.
- Note that oxidative or acid treatments of the SWCNT material are likely to cause sidewall chemical reactions that will permanently suppress SWCNT near-IR fluorescence. The most strongly emissive samples will be prepared from pristine, “unpurified” nanotube material.