# Purification of Detonation Nanodiamond

Eiji Ōsawa

*NanoCarbon Research Institute, 1080 Yabutsuka, Chosei-mura, Chosei-gun, Chiba 2994395, Japan*

Following our successful disintegration of commercial detonation nanodiamond aggregates into primary particles (ca 4 nm in average diameter) of cubic single-crystals by agitator milling with ceramic microbeads, we proceeded to remove non-diamond contaminants, which amounted to as high as 30% of the total weight according to direct determination of diamond carbon content by quantitative diffraction intensity measurements using NaF as external standard. At the time of writing this abstract, we have not yet been successful to reach acceptable level of purity but hope to report good results in time.

Handling of single-digit nano-sized carbon particles involves unexpected difficulties. Dark-colored and thick aqueous colloidal solution of nanodiamond particles as it came out from milling is surprisingly stable but its re-aggregation process is difficult to control. Note a small but un-equilibrated distribution of lightly re-aggregated particles centered at 33 nm in Fig. 1. Evaporation of medium, heating, changes in pH, and contact with oxygen quickly break up the colloidal dispersion to form enormous aggregates and sometimes even precipitation. Nevertheless, we could decolorize the colloid.

E-mail: osawa@nano-carbon.com

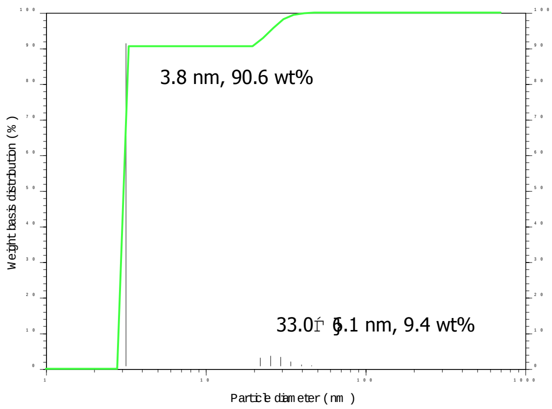


**Fig. 1.** Typical weight-based particle distribution diagram immediately after milling by dynamic laser scattering.

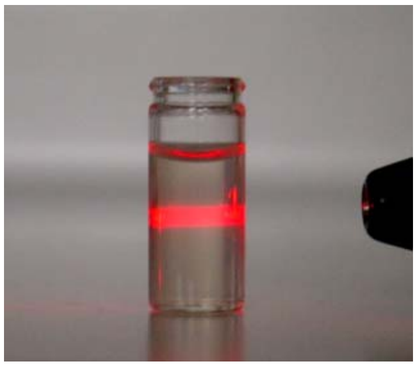

**Fig. 2.** Tyndall phenomenon by irradiation of laser pointer light to the purified colloidal solution of nanodiamond.