Supporting Information

Raman RBM maps consist of 1225 spectra on 10 µm² regions, these RBM spectra are used as models to fit (direct classic least square) individual spectrum in the Raman RBM maps. Multivariate analysis classified individual spectrum in Raman RBM maps into groups by the systematic and significant variances between them. This is numerical analysis based on the variance of the data set. Each spectra group consists of several hundred spectra and was categorized individual group by between class variances. Supporting figure shows high magnification Raman RBM spectra of three different VA-SWNTs and they have slight shift between each group. Each colored line represents peak positions of same colored spectra group. Colored lines show the difference between RBM band positions of groups. Because each group have several hundred of spectra, slight shift of spectrum is significant. Individual RBM spectrum group in the map was calculated their scores (degree of similarity with respect each model) and Raman RBM images show spatial diameter distribution of VA-SWNTs based on their scores as shown in Fig. 3.
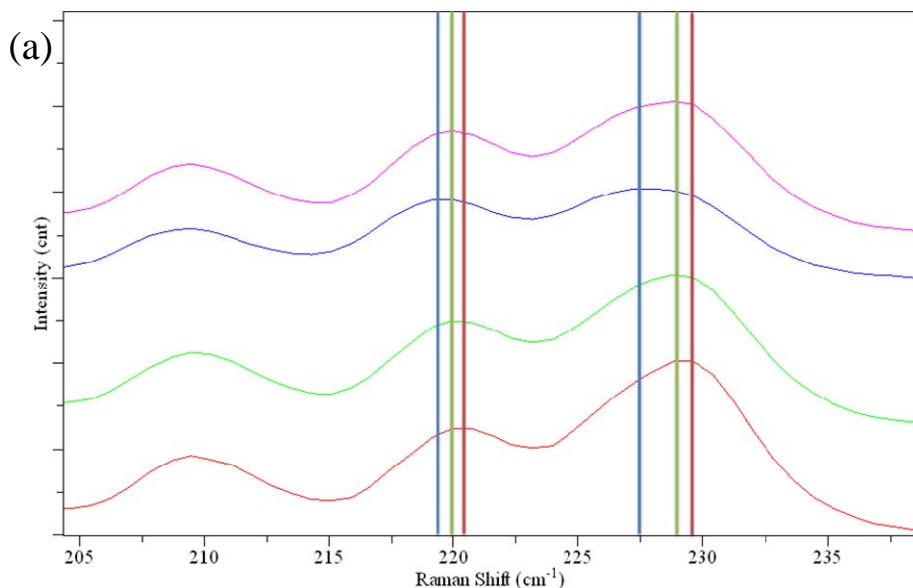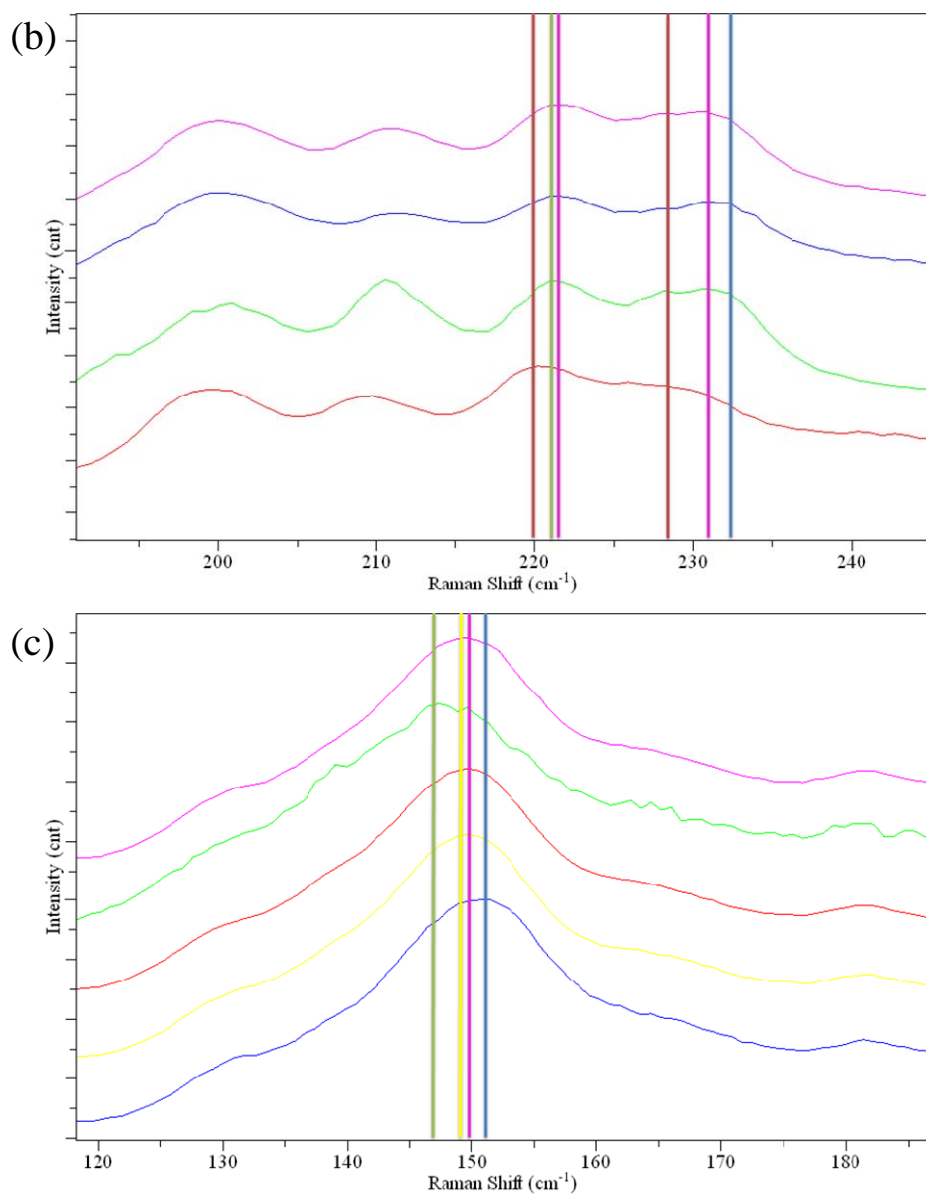
**Figure.** High magnification Raman RBM spectra of VA-SWNTs synthesized with three different ethanol flow rate (50, 100 and 200 sccm). Each colored line fitted on band position of same colored spectra group. Each spectrum group have 2 ~ 3 number different Raman shift. (a) Raman RBM spectra of SWNTs grown with 50 sccm ethanol flow rate, (b) RBM spectra of SWNT synthesized with 100 sccm flow rate of ethanol, (c) Raman RBM spectra from SWNTs grown with 200 sccm flow rate of ethanol vapor.