**Gaussian fit to extract representative mineral density values**

**Histograms** distribution of mineral densities and frequency of occurrence illustrated several peaks (Fig. S1). Gaussian function was fitted and the peak values were taken as the representative values of mineral density with the highest occurrence in any given section. The following criteria were used to pick significantly distinct Gaussian peaks

1). If |b2-b1| > HW2+HW1, fit as 2 peaks, because these 2 peaks are well separated;

2). If |b2-b1|≤ HW2+HW1, discard the bi-peaks fit and fit the curve with mono- peak Gaussian

Where: b1 and b2 are the locations of the 1st/2nd peak; HW1/HW2 is the half-width at half-maximum of the 1st and 2nd peaks. Take for example (Fig.S1, |b2-b1|=7.2µm, HW2+HW1=5.9 µm, so |b2-b1| > HW2+HW1. As a result, two curves can be fitted within a range [0, 35] instead of one curve.