Study of plant leaf-derived graphene quantum dots through magnetic force microscopy

Chiashain Chuang¹, D. Masahiro Matsunaga¹, Prathik Roy², D. Rini Ravindranath³, Huan-Tsung Chang³, Chi-Te Liang³, and Nobuyuki Aoki¹

Chiba Univ.¹, Univ. of Canterbury² and National Taiwan Univ.³

E-mail: chiashain@gmail.com

#:These authors have contributed equally.

The magnetic property in graphene quantum dots (GQDs) comes from the zigzag edge of spin effect due to the theoretical predictions [1]. Plant leaf-derived GQDs have revealed excellent photoluminescent property in addition to unusual magnetic property due to its extreme small nano-scale size (< 10 nm) [2-3]. We have studied the magnetic microstructure of different plant-leaf-derived GQD clusters (100 nm < d < 500 nm) spin-coated on SiO₂/Si chip by magnetic force microscopy (MFM) and observed evidences of magnetic property at room temperature as shown in Fig. 1 in the GQD clusters. These results could potentially lead to carbon-based materials for magnetic information technology, a great advantage for future graphene-based spin manipulation nanodevices.

Figure 1: (a) Magnification of AFM image and the line profile (blue line). (b) Magnification of MFM image and the line profile (blue line).

Reference: