

Abstract Submitted
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Identifying the orientation of edge of graphene using G band Raman spectra¹ K. SASAKI, NIMS, Japan, S. MURAKAMI, Tokyo Tech and PRESTO, JST, Japan, R. SAITO, Tohoku University, Japan, M.S. DRESSELHAUS, MIT, USA, K. TAKAI, T. MORI, T. ENOKI, Tokyo Tech, Japan, K. WAKABAYASHI, NIMS and PRESTO, JST, Japan — The electron-phonon (el-ph) matrix element may depend on position in graphene since an electronic wave function is position dependent. In particular, the el-ph matrix element near the edges of graphene can differ from those in the bulk. We are pursuing our studies on this point in relation to Raman spectroscopy. Our theoretical studies on the Raman G band near the edges of graphene show that the Raman intensity is enhanced when the polarization of Raman laser is parallel (perpendicular) to the armchair (zigzag) edge. This asymmetry between the armchair and zigzag edges is useful in identifying the orientation of the edge of graphene. Kohn anomalies near the edges of graphene are also reported on. The analysis of the pseudospin reveals that the LO phonon mode undergoes a strong Kohn anomaly both for the armchair and zigzag edges, and that only the LO (TO) mode is Raman active mode near the armchair (zigzag) edge. (ref.) K. Sasaki et al., PRB 80, 155450 (2009); K. Sasaki et al., arXiv:0911.1593.

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