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Probing Interfacial Processes on Graphene Surface by Mass Detection[1] NURBEK KAKENOV, COSKUN KOCABAS, Bilkent University — In this work we studied the mass density of graphene, probed interfacial processes on graphene surface and examined the formation of graphene oxide by mass detection. The graphene layers were synthesized by chemical vapor deposition method on copper foils and transfer-printed on a quartz crystal microbalance (QCM). The mass density of single layer graphene was measured by investigating the mechanical resonance of the QCM. Moreover, we extended the developed technique to probe the binding dynamics of proteins on the surface of graphene, were able to obtain nonspecific binding constant of BSA protein of graphene surface in aqueous solution. The time trace of resonance signal showed that the BSA molecules rapidly saturated by filling the available binding sites on graphene surface. Furthermore, we monitored oxidation of graphene surface under oxygen plasma by tracing the changes of interfacial mass of the graphene controlled by the shifts in Raman spectra. Three regimes were observed the formation of graphene oxide which increases the interfacial mass, the release of carbon dioxide and the removal of small graphene/graphene oxide flakes.

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