

## Growth of graphene: Fundamentals and its application

황찬용<sup>1</sup>, 유권재<sup>1,2</sup>, 서은경<sup>1</sup>, 김용성<sup>1</sup>, 김철기<sup>2</sup>

<sup>1</sup>한국표준과학연구원, <sup>2</sup>충남대학교

Ever since the experimental discovery of graphene exfoliated from the graphite flakes by Geim et al., this area has drawn a lot of attention for its possible application in IT industry. For the growth of graphene, chemical vapor deposition (CVD) has been widely used to fabricate the large area graphene. The lateral size of this graphene can be easily controlled by the size of the metal substrate though the chemical etching to remove this substrate is somewhat troublesome. Another problem which is hard to avoid is the folding at the grain boundary. We will discuss the origin of the folding first and introduce the way to avoid this folding. To solve this problem, we have used the various types of micro-thin metal foils. The precise control of hydro-carbon and the carrier gas results in the formation of the graphene on top of substrate. The thickness of graphene layers can be controlled with the control of gas flow on top of Cu substrate in contrast to the previously reported self-limiting growth behavior<sup>1</sup>. Uniformity of this graphene layer has been checked by micro-Raman spectroscopy and SEM. The size of grain can be enhanced by thermal treatment or use of other metal substrate. The dependence of grain size on the lattice size of the substrate will be discussed. By selecting the shape of substrate, we can grow various types of graphene. We will introduce the micron size graphene tube and its application.

1. Xuesong Li et al., Science 324, 1312 (2009)