Intercalation of graphene on Ru(0001): possible mechanisms

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Epitaxial graphene (EG) on Ru(0001) is characterized by strong interaction with the support which results in the presence of a Moiré superstructure with ~30 Å periodicity [1] and locally modified electronic structure [2]. It has been shown that by intercalating the EG with atoms of various elements it is possible to modify the structure and electronic properties of EG, which is related both to the weakening of the graphene-support interaction, as well as to the interaction of graphene with the intercalated material [3-5]. We used scanning tunneling microscopy (STM), low energy electron microscopy (LEEM) and low energy electron diffraction (LEED) to study the mechanisms of intercalation of epitaxial graphene (EG) grown on Ru(0001) by thermal decomposition of ethylene (C_2H_4) [1]. The results revealed direct influence of the graphene's preparation method on its structure and the intercalation mechanisms. The experimental results were supported by theoretical *ab initio* calculations.

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