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Metal surface melting effect on the formation of graphene wrinkles TEREZA PARONYAN, ELENA PIGOS, AVETIK HARUTYUNYAN, Honda Research Institute, USA Inc., Columbus, OH, 43212, USA, HONDA RESEARCH INSTITUTE TEAM — The synthesis of high quality large area graphene is a significant challenge that needs to be overcome for practical applications of this material. Therefore, understanding the growth mechanism of graphene is crucial in order to explain the origin of defects on it. Different thickness of Copper and Nickel films deposited on silica substrates, and foils with various degrees of purity were used in this study. We investigated the changes in the surface morphology of the thin films and foils with temperature at 860-1100°C with and without growth of graphene by Chemical Vapor Deposition method. Detailed investigation by Raman spectroscopy, SEM and AFM analysis revealed that thermal treatment of the metal substrates at high temperatures ∼1000°C causes formation of dendritic like structures on the surface. We attributed these structures to the non-equilibirium solidification of the melted surface of the metal during the cooling, which are also present in the case of graphene growth. We concluded that the reconstruction of the metal surface morphology in the case of graphene growth, due to the surface melting, significantly affects on the final topography of the graphene wrinkles and, thereby on the quality of graphene.

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