## Contribution submission to the conference SKM 2023

**In-situ monolayer graphene growth on Ru($10\bar{1}0$): an electron microscopy study** — •Cathy Sulaiman, Lukas Schewe, Lars Buss, Moritz Ewert, and Jan Ingo Flege — Applied Physics and Semiconductor Spectroscopy, Brandenburg University of Technology Cottbus-Senftenberg, Germany

During the last decade, the controlled growth of monolayer (MLG) and bilayer graphene has extensively been studied on the hexagonal Ru(0001) surface, which is a system that is known to form strong chemical bonds at the metal-graphene interface. Yet, little attention was paid to the influence of the substrate orientation that was demonstrated to have a significant impact for graphene growth on the Ir(001) and Ir(111) surfaces, the latter exhibiting a weak coupling between the graphene and the support. Therefore, in this study we have grown graphene on the rectangular Ru($10\bar{1}0$) surface by segregation and ethylene-supported chemical vapor deposition. A photoemission and low-energy electron microscope (PEEM & LEEM) has been utilized to directly characterize the MLG growth process with respect to variations in substrate temperature and step orientation. The expansion of the MLG islands is compared to the well-established carpet-growth mode on the Ru(0001) surface. These results have been complemented by probing of the occupied and unoccupied electronic structure of the islands using PEEM and intensity-voltage LEEM. Furthermore, the existence of two preferential surface reconstructions is identified via micro-illumination low-energy electron diffraction (LEED), whose spatial distribution is revealed by employing dark-field LEEM imaging.

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