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## Monitoring of epitaxial graphene anodization

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### Abstract

Anodization of a graphene monolayer on silicon carbide was monitored with electrochemical impedance spectroscopy. Structural and functional changes of the material were observed by Raman spectroscopy and voltammetry. A 21 fold increase of the specific capacitance of graphene was observed during the anodization. An electrochemical kinetic study of the  $\text{Fe}(\text{CN})_6^{3-/4-}$  redox couple showed a slow irreversible redox process at the pristine graphene, but after anodization the reaction rate increased by several orders of magnitude. On the other hand, the  $\text{Ru}(\text{NH}_3)_6^{3+/2+}$  redox couple proved to be insensitive to the activation process. The results of the electron transfer kinetics correlate well with capacitance measurements. The Raman mapping results suggest that the increased specific capacitance of the anodized sample is likely due to a substantial increase of electron doping, induced by defect formation, in the monolayer upon

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