

# Controlled Chemistry of Oxo-functionalized graphene and graphene oxide

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The structure of graphene oxide is a matter of discussion since more than 150 years. Many aspects of the chemical structure of graphene oxide is known nowadays. Ideally, the hexagonal lattice of graphene carries oxo-addends. We introduced that material, termed as oxo-functional graphene (oxo-G). Oxo-G is a novel class of materials, which bears a hexagonal carbon lattice, a high surface purity and on-plane functional groups in majority. HRTEM micrographs demonstrate the lattice structure.[1] Moreover oxo-G bears no relevant amounts of oxidative debris and thus, graphene oxide can be considered as a one-component system.[2]. Oxo-G can be used to control the chemistry of surface functional groups and we identified endoperoxides as source of the toxicity of oxo-G. Toxic endoperoxides can be removed to allow bio-applications.[3] Controlling the on-plane chemistry of oxo-G gives access to controlled structures and with a defined composite we demonstrate the extension of the life-time of perovskite/PCBM solar cells.[4] Rationally designed graphene derivatives have the potential to boost the performance in applications, such as information storage or solar cells.

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## References

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