OPTOELECTRONICS MEETS OPTOIONICS: ENERGY CONVERSION AND LIGHT STORAGE IN 2D CARBON NITRIDES

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Utilization and storage of intermittent energy resources such as wind or solar power is a cornerstone of a renewable energy infrastructure. To meet this challenge, new material concepts are vital. Using the light and dark reactions of natural photosynthesis as a blueprint, we have recently identified a new generation of "light storing" materials that can both convert and store solar energy via trapping of light-induced charge carriers.

In this talk, we will discuss the potentially rich interface between solar energy harvesting, conversion and storage enabled by heptazine-based, ionic 2D carbon nitrides. We exemplify the utility of simultaneous light harvesting and storage by the concepts of time-delayed, "dark" photocatalysis and direct solar batteries. We will further showcase light-driven microswimmers with photocapacitive properties, which build a bridge between energy converting and autonomous systems.