# Plasma-induced optically active defects in hexagonal boron nitride

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Hexagonal boron nitride (hBN) has been the subject of numerous research efforts in the last decade. Of particular interest is the creation of optically active defects in hBN because of their easy integration, e.g., in van der Waals heterostructures, and their room temperature photon emission. Many methods to create such defects in hBN are still under investigation. In this work, we present our approach to create single defect emitters in hBN using remote plasma. We have used argon, nitrogen, and oxygen plasmas and report statistics on the emitters, produced by the different gas species and their optical properties. In particular, we examine the emission of the exfoliated flakes before and after the plasma processes without an annealing step to avoid creating emitters that are caused by a thermal annealing process. Our findings suggest that the purely physical argon plasma treatment is the most promising route for creating optically active defect emitters in hBN by plasma exposure.

## Figures

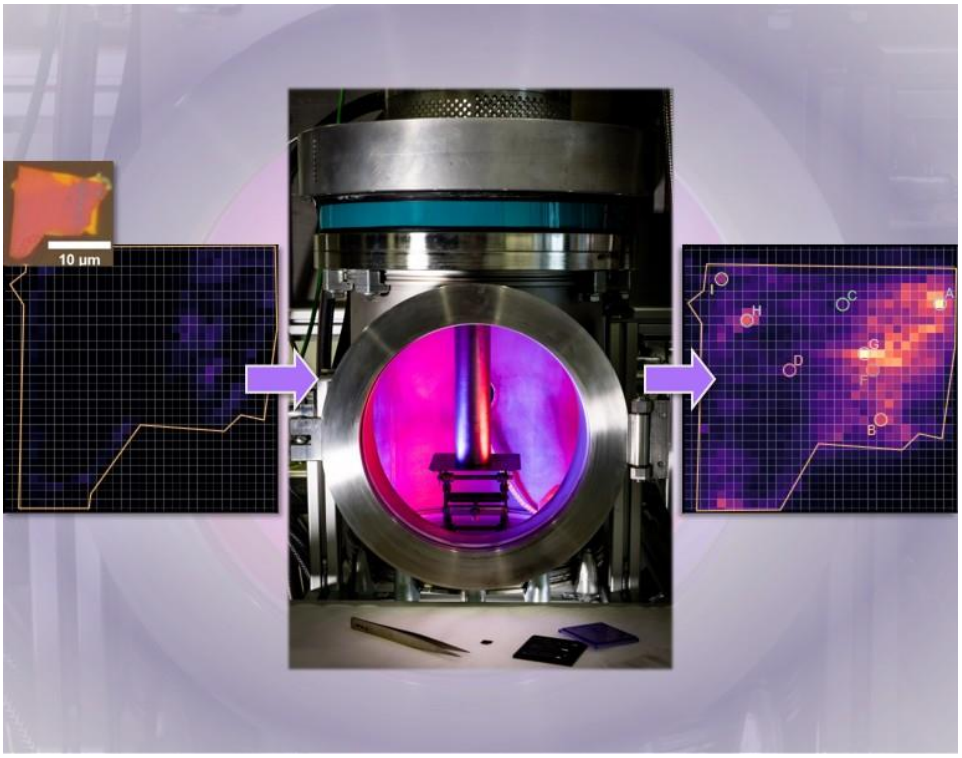


**Figure 1:** Spatially resolved photoluminescence (PL) maps of a hBN flake before (left) and after (right) a successful plasma treatment. In the left top corner of the PL-map an optical microscope image of the flake is shown. The middle part shows our self-build remote plasma chamber used for the plasma treatment.