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Application of a partially magnetized plasma for graphene hydrogenation.[1] YEVGENY RAITSES, Princeton Plasma Physics Laboratory, FANG ZHAO, CHRISTOPHER TULLY, Princeton University — The chemical functionalization of two-dimensional materials is an effective method for tailoring their electronical and chemical properties with encouraging applications in energy, catalysis and electronics. Recent experiments on graphene hydrogenation [1] revealed that with the applied magnetic field of 10-50 Gauss, a plasma generated by a DC-RF source of non-thermal electrons at a hydrogen pressure of about 10 mtorr is capable to achieve a high (˜36%) hydrogen coverage without damage on monolayer graphene. Plasma measurements revealed that with the applied magnetic field, the plasma density and the density of hydrogen atoms are much larger than without the magnetic field. The latter explains a high converge observed in the treated 2D material. [1] F. Zhao, Y. Raitses, X. Yang, A.Tan, and C. G. Tully, "High hydrogen coverage on graphene via low temperature plasma" submitted to journal (2020).

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