Recent advances in atomic force microscopy (AFM) and scanning tunnelling microscopy (STM) have allowed the visualization of single organic molecules adsorbed on different surfaces with ultrahigh resolution [1]. These techniques provide a powerful tool to address long-standing challenges in organic chemistry such as the analysis of complex organic mixtures or the characterization of elusive molecules. In addition, the possibility to use the surface as catalyst or to induce chemical reactions with the tip of the microscope (Fig. 1A) open up exciting applications in chemistry [2]. For example, on-surface synthesis is now the key method to prepare well-defined graphene nanoribbons (Fig. 1B) [3]. In this seminar I will discuss the emergence of this new discipline in the interphase between organic chemistry and surface science.

Figure 1. Examples of a tip-induced chemical reaction (A, ref. 1) and on-surface synthesis of graphene nanoribbons (B, ref. 3) studied by AFM and STM, respectively.

References