Environmental TEM investigation of the mechanism of soot combustion by Ag supported catalysts

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Since Particulate Matter (PM) emissions have been regulated by US/EU standards for Diesel motor vehicles, a Diesel Particle Filter (DPF) has become mandatory to satisfy the required levels. To assist the regeneration of the DPF, oxidation catalysts combining good activity performance and stability under exhaust conditions are used. This work reports the soot oxidation mechanism on silver nanoparticles (NPs) supported over Yttria-Stabilized Zirconia (YSZ), a well-known oxygen ionic conductor active for soot oxidation thanks to its bulk oxygen mobility. In the course of a converging experimental study of the synergy for soot combustion between Ag NPs and YSZ, different characterizations techniques, such as Temperature Programmed Oxidation and Reduction, XPS, isotopic $^{18}O_2$ exchange have been implemented. We focus here on additional in situ oxidation experiments performed at high temperature in Environmental Transmission Electron Microscopy (ETEM) in order to elucidate the role of Ag NPs and better understand the mechanism of soot combustion[1].

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