

Fullerene-like Soot from EURO-IV Diesel Engine: Consequences for Catalytic Automotive Pollution Control

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Abstract

Soot particulates are sampled from a EURO-IV standards diesel engine and investigated by high-resolution electron microscopy (HRTEM) and thermal gravimetry (TG). The experiments reveal a drastic reduction of primary particle size down to less than 20 nm, much smaller than that emitted by earlier diesel engines (EURO I-III). HRTEM reveals primary particles with deformed fullerene-like structures. The defective fullerene-like soot is more prone to oxidation than the soot of a black smoking EURO-III diesel engine. Our findings may initiate a critical review of the current strategy for the reduction of soot emission from diesel engines. The newly developed engines reduce the quantity of soot emitted, but they also emit smaller soot particles with fullerene-like structure into the exhaust.