Electronic Supplementary Material (ESI) for RSC Advances.

Copper doped $BaMnO_3$ perovskite catalysts for NO oxidation and NO_2-assisted diesel soot removal.

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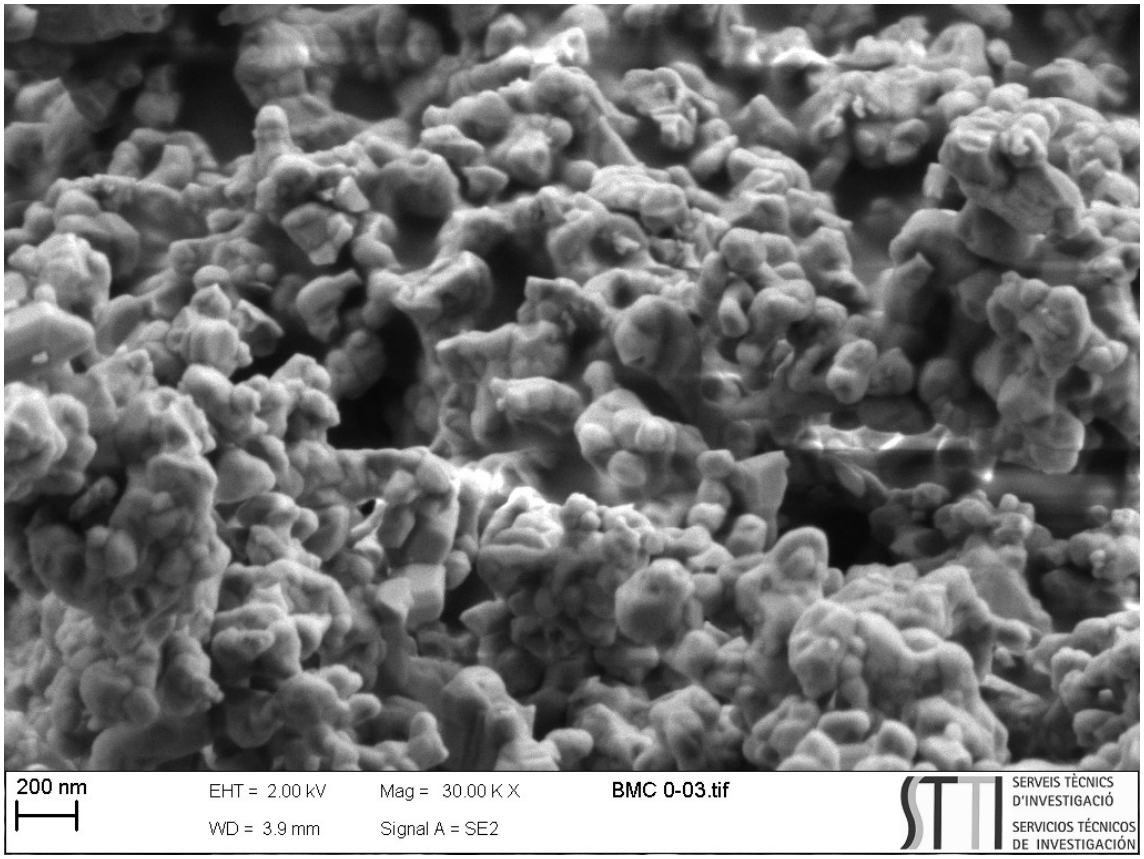
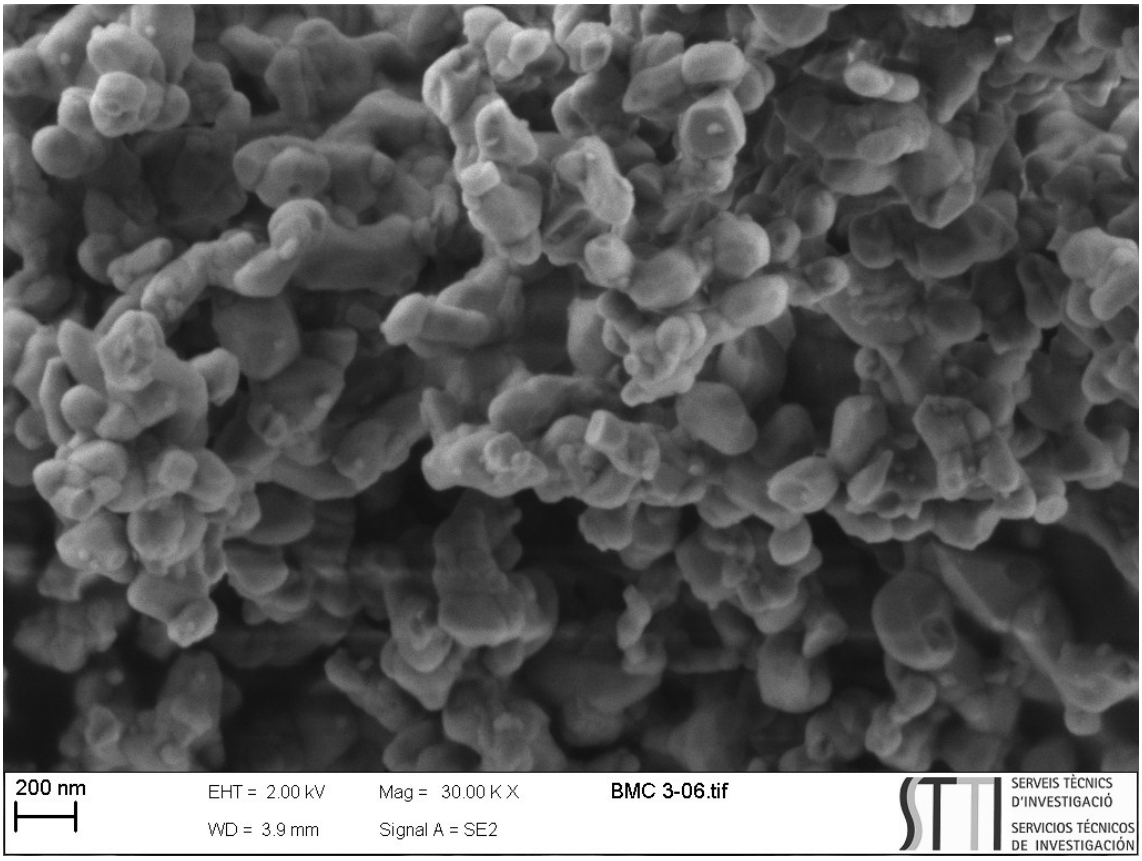
Figure S1. FESEM images of a) BMC0 and b) BMC3

a) BMC0



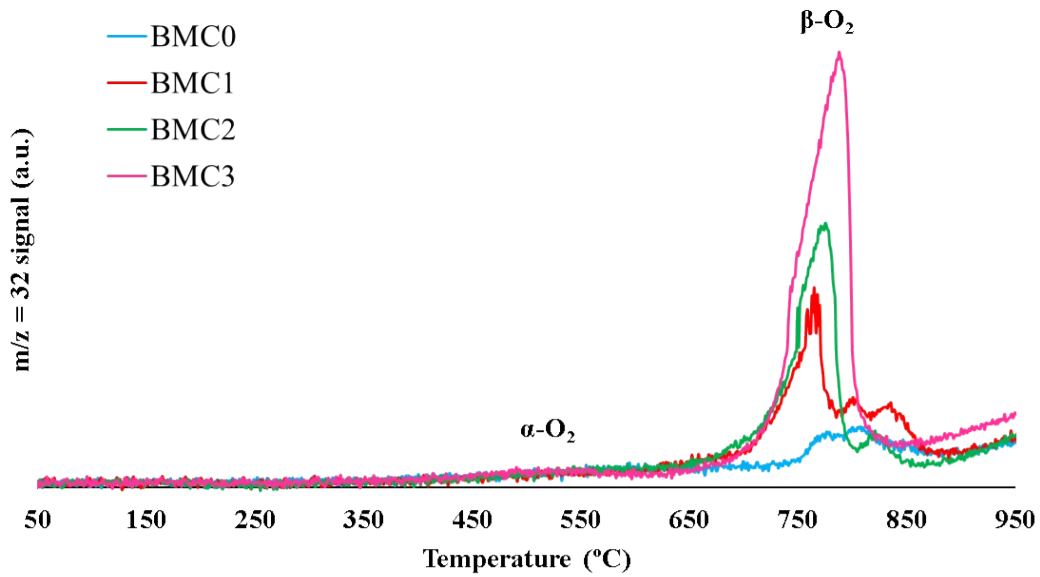
b) BMC3



Experimental details

The morphology of catalysts was analyzed using a ZEISS Merlin VP Compact Field Emission Scaning Electron Microscopy (FESEM) equipment.

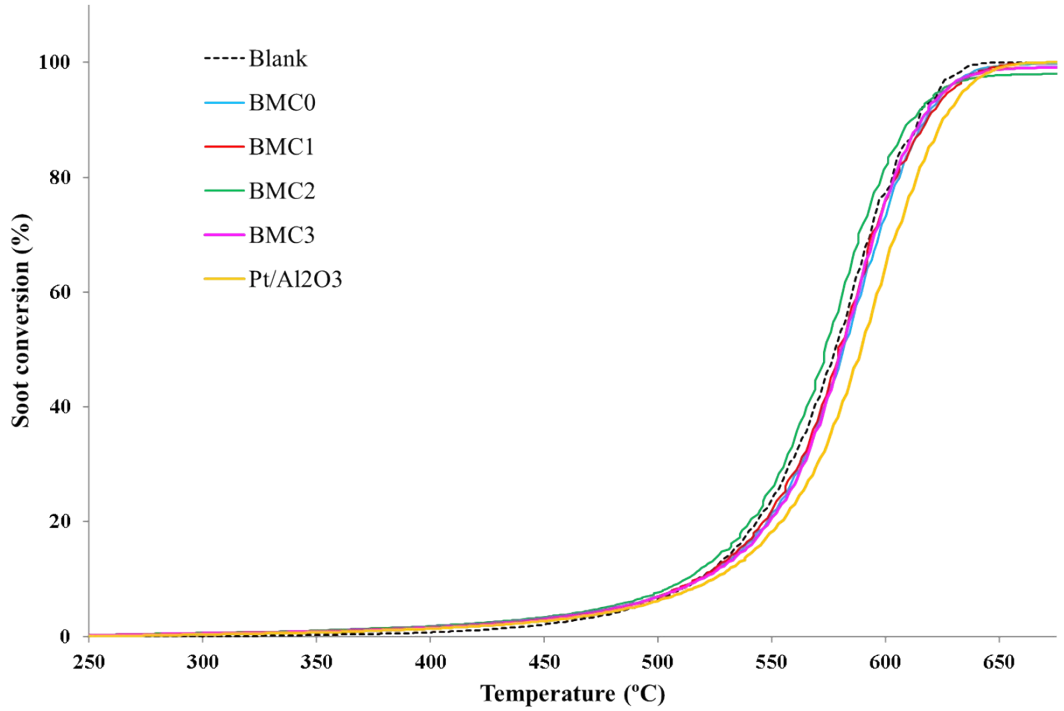
Figure S2 O_2-TPD profiles of the $BaMn_{1-x}Cu_xO_3$ catalysts.



Experimental details

Oxygen desorption experiments under temperature programmed conditions (O_2-TPD) were carried out by heating 20 mg of the catalyst in a quartz tube reactor at 10 ºC/min from room temperature to 950 ºC in He atmosphere (100 ml/min, Pt = 1 atm). The composition of the outlet gas was monitored by means of a quadrupolar mass spectrometer (QMS), PFEIFFER VACUUM model THERMOSTAR GSD301T.

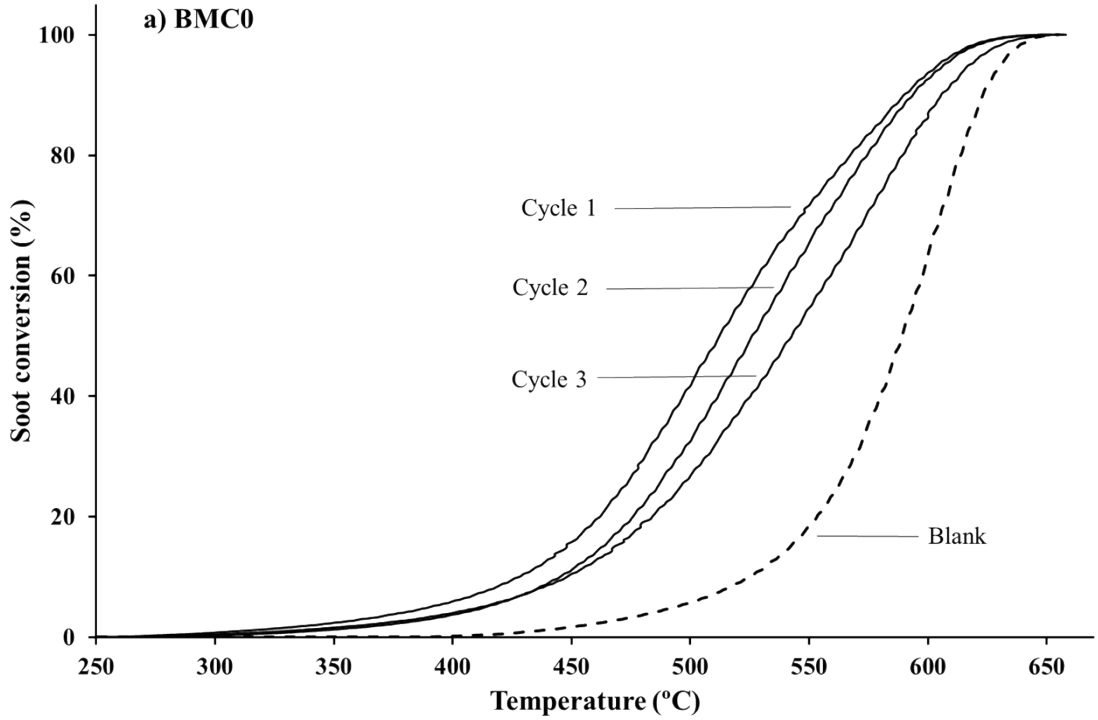
Figure S3. TPR Soot conversion profiles of the $BaMn_{1-x}Cu_xO_3$ and platinum reference catalysts in O_2 atmosphere.

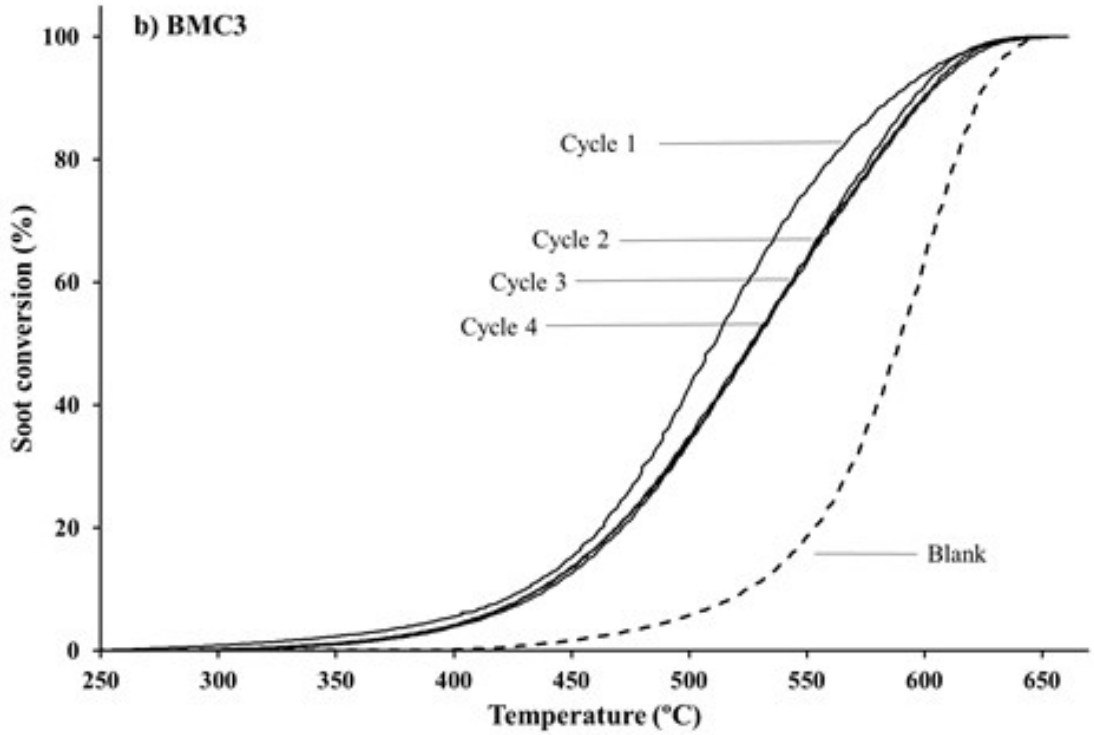


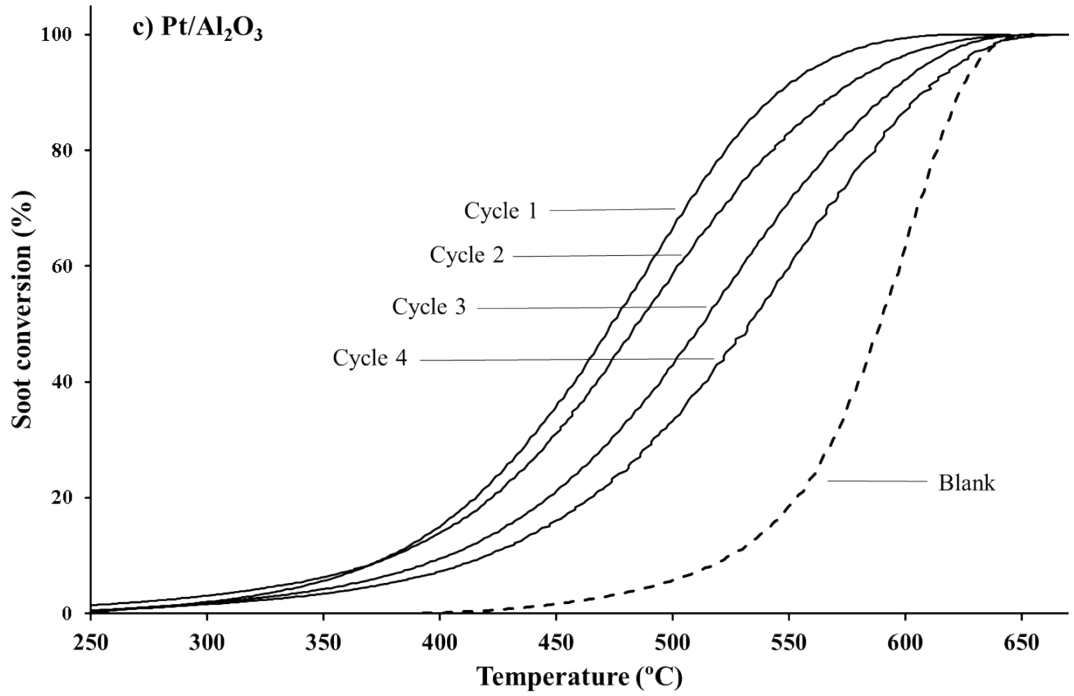
Experimental details

Soot oxidation catalysts activity was determined by Temperature Programmed Reaction (TPR) using an atmosphere containing 5 % O_2 and balance with N_2, and a gas flow of 500 ml/min. 80 mg of the sample and 20 mg of Printex U carbon black were diluted with SiC in a mass ratio 1:4, and heated up from 25 to 800 °C, at 10 °C/min in a quartz fixed-bed reactor. The gas composition as a function of temperature was monitored by specific NDIR-UV gas analyzers for NO, NO_2, CO, CO_2 and O_2 (Rosemount Analytical Model BINOS 1001, 1004 and 100).

Figure S4. Cycles of TPR Soot conversion profiles of a) BMC0, b) BMC3 and c) Pt/Al_2O_3.







Experimental details

Cyclic soot oxidation catalysts activity was determined by Temperature Programmed Reaction (TPR) using an atmosphere containing 500 ppm NO, 5 % O_2 and balance with N_2, and a gas flow of 500 ml/min. 80 mg of the sample and 20 mg of Printex U carbon black were diluted with SiC in a mass ratio 1:4, and heated up from 25 to 800 °C, at 10 °C/min in a quartz fixed-bed reactor. The gas composition as a function of temperature was monitored by specific NDIR-UV gas analyzers for NO, NO_2, CO, CO_2 and O_2 (Rosemount Analytical Model BINOS 1001, 1004 and 100).

Table S1. XPS surface elemental composition of the $BaMn_{1-x}Cu_xO_3$ catalysts.

	XPS surface w.t.%							
	Barium		Manganese		Copper		Oxygen	
Catalyst	XPS	Nominal	XPS	Nominal	XPS	Nominal	XPS	Nominal
BMC0	56.1	57.2	13.6	22.9	-	-	30.3	20.0
BMC1	47.9	57.0	11.3	20.5	1.4	2.6	39.5	19.9
BMC2	57.6	56.8	12.2	18.2	2. 6	5.3	27.6	19.8
BMC3	47. 7	56.6	10.0	15.8	2.8	7.9	39. 6	19.8

Surface elemental composition of the $BaMn_{1-x}Cu_xO_3$ catalysts calculated from the peak area of O1s, $Mn2p_{3/2}$, $Ba3d_{5/2}$ and $Cu2p_{3/2}$ transitions.