

# Low temperature total oxidation of toluene by bimetallic Au-Ir catalysts

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## SUPPLEMENTARY INFORMATION

The reaction rate shown in Table S1 is calculated as follows:

$$\text{Reaction rate} \left( \frac{g_{tol}}{kg_{cat} \cdot h} \right) = \frac{g_{toluene} \text{ converted}}{h \cdot kg_{catalyst}}$$

$$\text{Reaction rate} \left( \frac{g_{tol}}{kg_{metal} \cdot h} \right) = \frac{g_{toluene} \text{ converted}}{h \cdot kg_{metal}}$$

The total amount of metal in the bulk of the different catalysts, according to Table 1 is used in the calculations.

**Table S1. Catalytic performance of Au, Ir and AuIr catalysts in the total oxidation of toluene.**

Catalyst	T20 <sup>a</sup>	T50 <sup>a</sup>	T90 <sup>a</sup>	Reaction rate <sup>b</sup>	
	(°C)	(°C)	(°C)	(g <sub>toluene</sub> kg <sub>cat</sub> <sup>-1</sup> h <sup>-1</sup> )	(g <sub>toluene</sub> kg <sub>metal</sub> <sup>-1</sup> h <sup>-1</sup> ) <sup>c</sup>
2% Au /TiO <sub>2</sub>	255	280	290	0.244	12.2
2% Ir /TiO <sub>2</sub>	265	285	300	0.061	3.1
2% Au-Ir /TiO <sub>2</sub>	195	235	265	5.00	125.1

<sup>a</sup> Reaction temperature for toluene conversions of 20, 50 and 80%;

<sup>b</sup> Reaction conditions: Temperature 225 °C, 100 mg of catalyst, GHSV of 27000 h<sup>-1</sup>, feed composition toluene/O<sub>2</sub>/He with a molar ratio of 0.0833/20/80.

<sup>c</sup> Nominal metal content is used for these calculations.

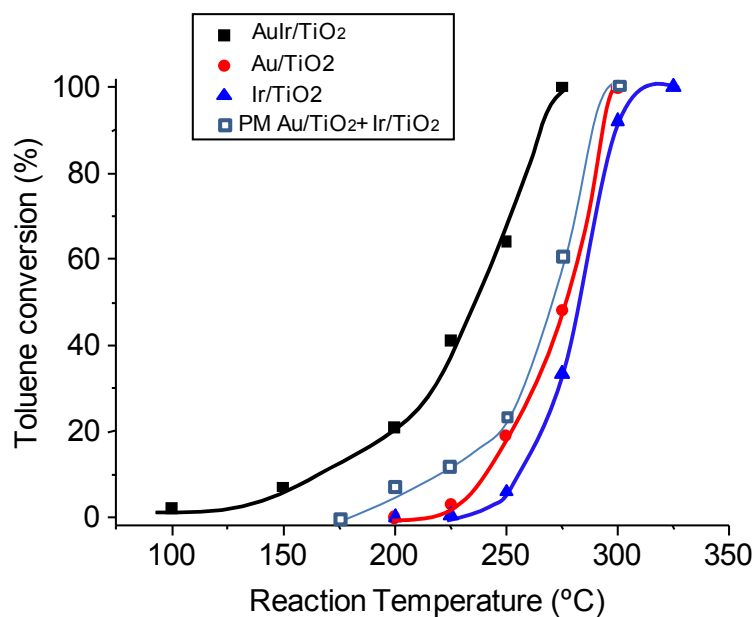
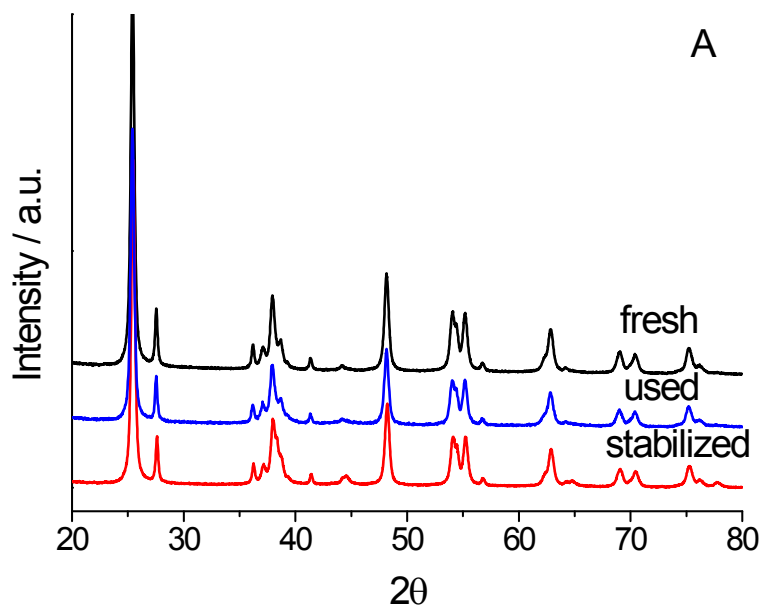


Figure S1: Catalytic conversion of toluene respect to temperature using ● Au/TiO<sub>2</sub>, ▲ Ir/TiO<sub>2</sub> and ■ Au-Ir/TiO<sub>2</sub> catalysts. For comparison a physical mixture of Au/TiO<sub>2</sub> and Ir/TiO<sub>2</sub> catalysts to give the same Au and Ir loading that the bimetallic catalyst has also been tested □.



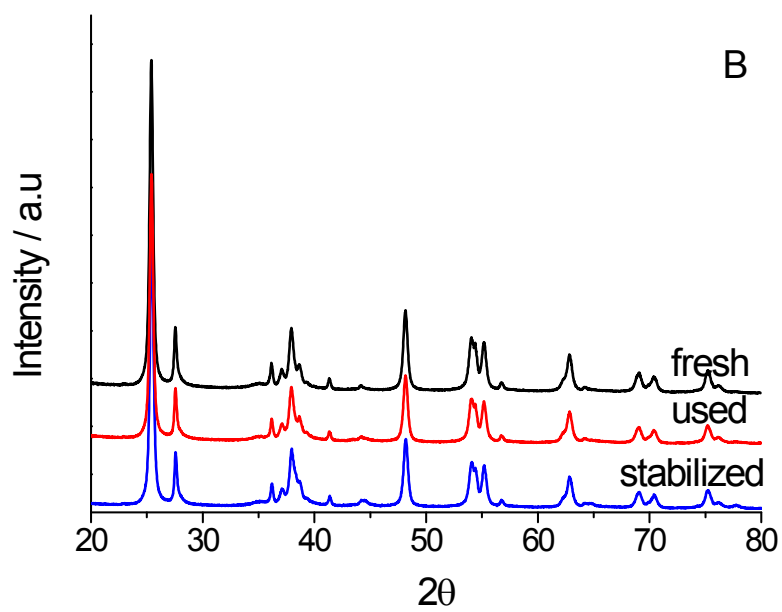


Figure S2. XRD profiles for the different Au/TiO<sub>2</sub> (A) and Au-Ir/TiO<sub>2</sub> (B) catalysts.