Figure S1 Autoxidation of nonan-5-one, 0.5 cm$^3$, 120 °C, 537 kPa oxygen; yields of carbon oxides as a function of oxygen consumption

Figure S2 Autoxidation of nonan-5-one, 0.5 cm$^3$, 120 °C, 537 kPa oxygen; yields of diketones as a function of oxygen consumption
**Figure S3** Autoxidation of nonan-5-one, 0.5 cm$^3$, 120 °C, 537 kPa oxygen; yields of hydroxyketones as a function of oxygen consumption. 

- 3-Hydroxynonan-5-one
- 4-Hydroxynonan-5-one

**Figure S4** Autoxidation of nonan-5-one, 0.5 cm$^3$, 120 °C, 537 kPa oxygen; yields of aldehydes as a function of oxygen consumption.

- Ethanal
- Propanal
- Butanal
Figure S5 Autoxidation of nonan-5-one, 0.5 cm$^3$, 120 °C, 537 kPa oxygen; yields of alcohols as a function of oxygen consumption

Figure S6 EI-MS fragmentation pattern of the α,α-dehydrodimer (B1), formed during the autoxidation of nonan-5-one at 120 °C, 537 kPa oxygen
Figure S7 EI-MS fragmentation pattern of the α,α-dehydrodimer (B2), formed during the autoxidation of nonan-5-one at 120 °C, 537 kPa oxygen.

Figure S8 EI-MS fragmentation pattern for ketone dehydrodimer A1, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen
**Figure S9** EI-MS fragmentation pattern for ketone dehydrodimer A2, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen.

**Figure S10** EI-MS fragmentation pattern for ketone dehydrodimer B1, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen.
Figure S11  EI-MS fragmentation pattern for ketone dehydrodimer B2, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen

Figure S12  EI-MS fragmentation pattern for ketone dehydrodimer C1, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen
Figure S13 EI-MS fragmentation pattern for ketone dehydrodimer C2, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen.

Figure S14 EI-MS fragmentation pattern for ketone dehydrodimer D1, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen.
Figure S15 EI-MS fragmentation pattern for ketone dehydrodimer D2, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen