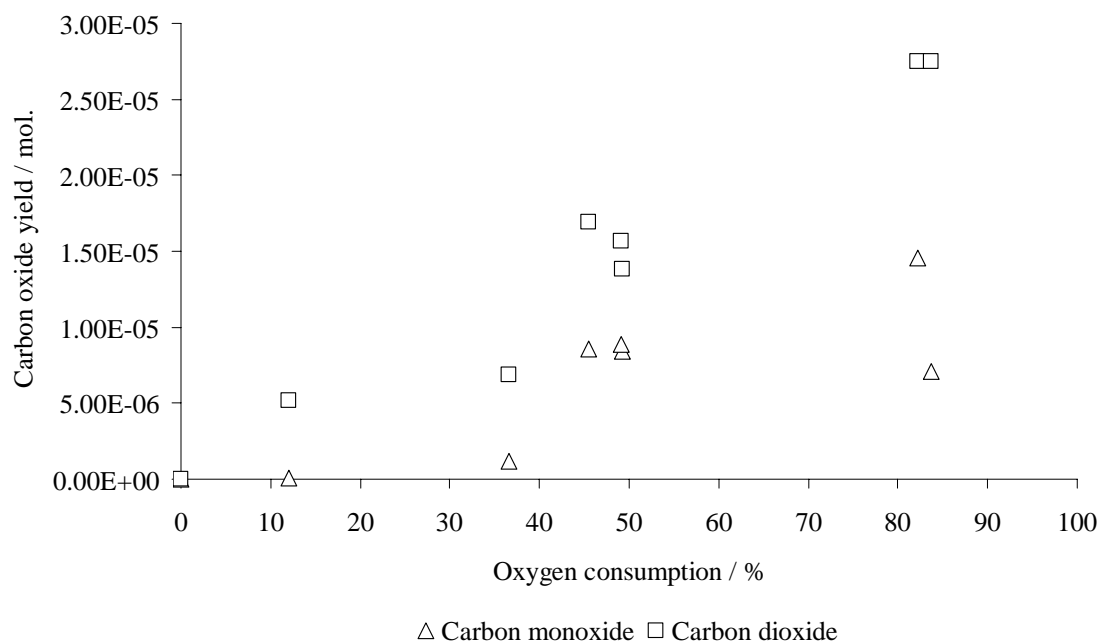
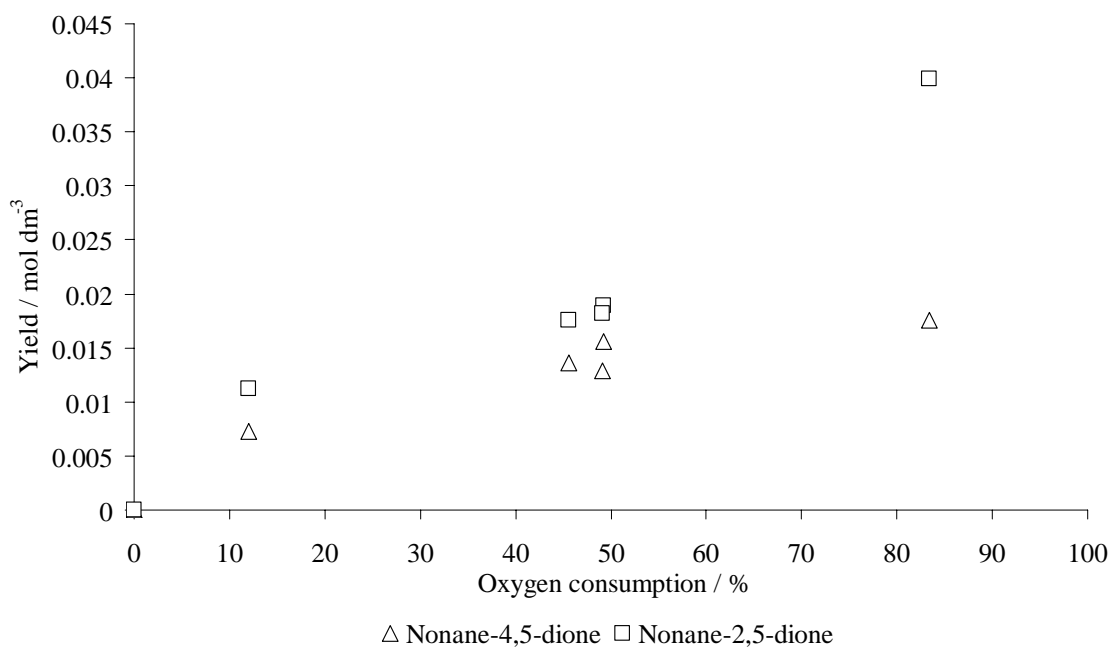


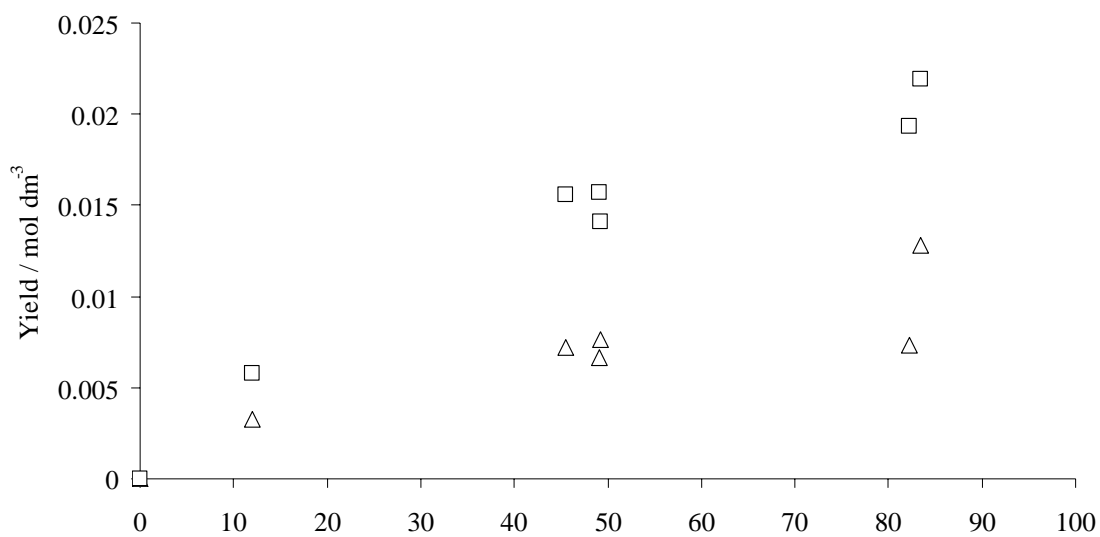
## Supplementary Information



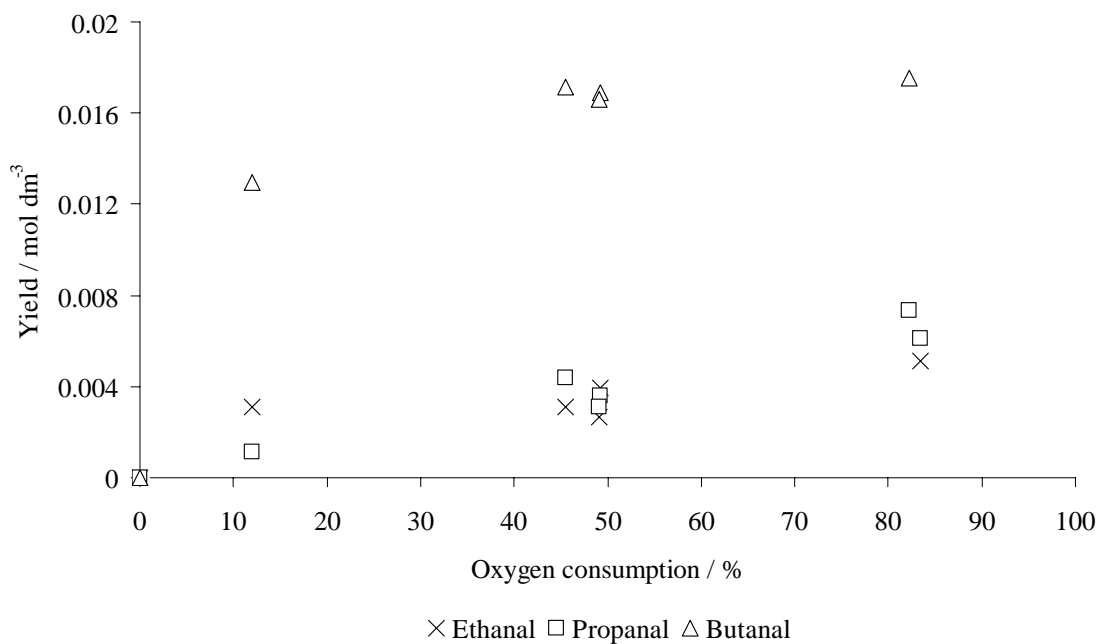
**Figure S1** Autoxidation of nonan-5-one, 0.5 cm<sup>3</sup>, 120 °C, 537 kPa oxygen; yields of carbon oxides as a function of oxygen consumption



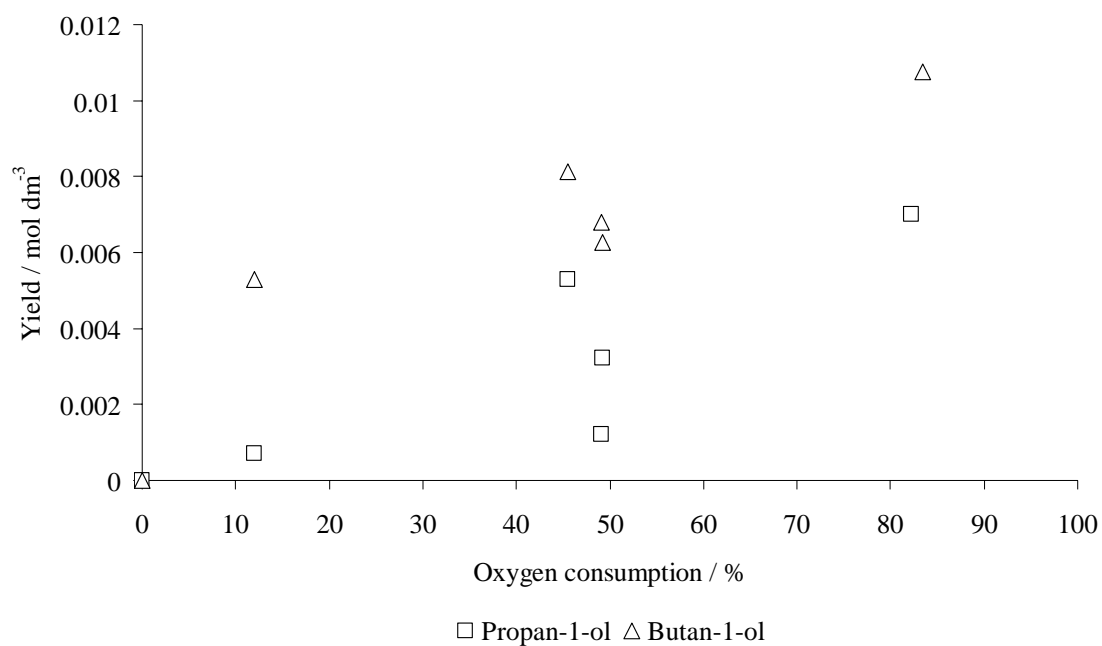
**Figure S2** Autoxidation of nonan-5-one, 0.5 cm<sup>3</sup>, 120 °C, 537 kPa oxygen; yields of diketones as a function of oxygen consumption



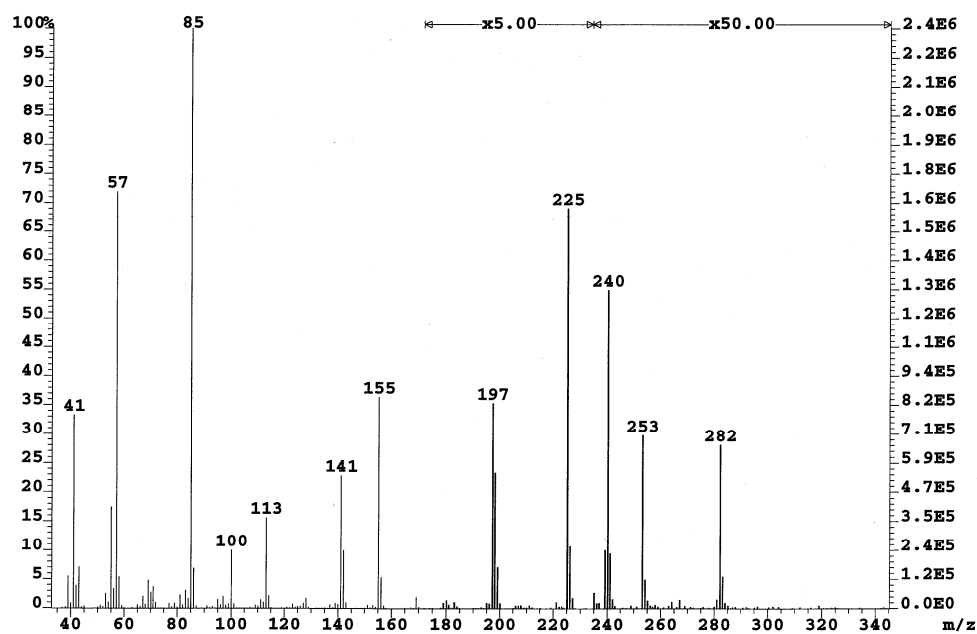
**Figure S3** Autoxidation of nonan-5-one, 0.5 cm<sup>3</sup>, 120 °C, 537 kPa oxygen; yields of hydroxyketones as a function of oxygen consumption. Δ 3-Hydroxynonan-5-one □ 4-Hydroxynonan-5-one



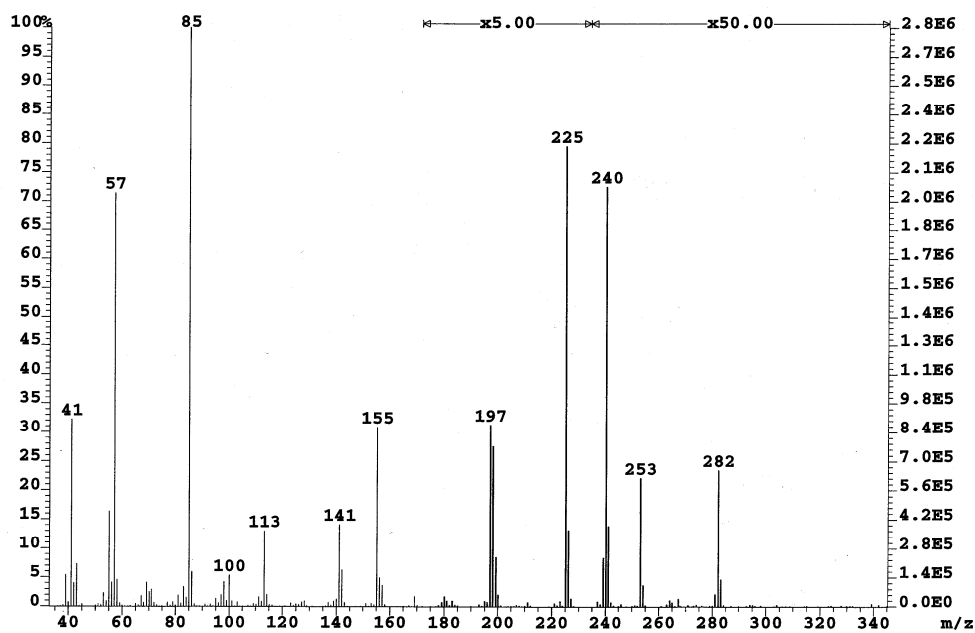
**Figure S4** Autoxidation of nonan-5-one, 0.5 cm<sup>3</sup>, 120 °C, 537 kPa oxygen; yields of aldehydes as a function of oxygen consumption



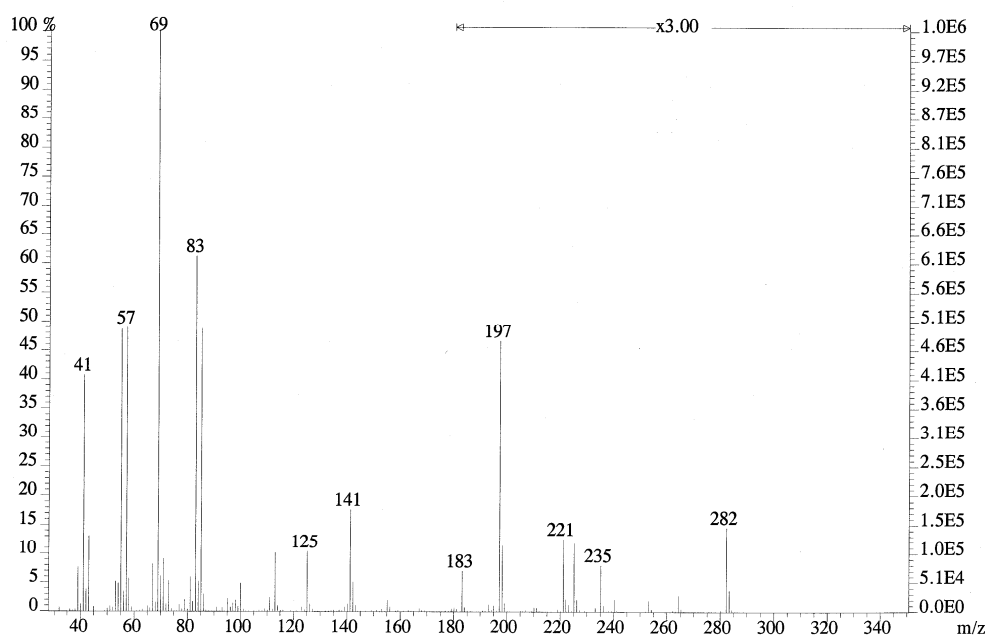
**Figure S5** Autoxidation of nonan-5-one, 0.5 cm<sup>3</sup>, 120 °C, 537 kPa oxygen; yields of alcohols as a function of oxygen consumption



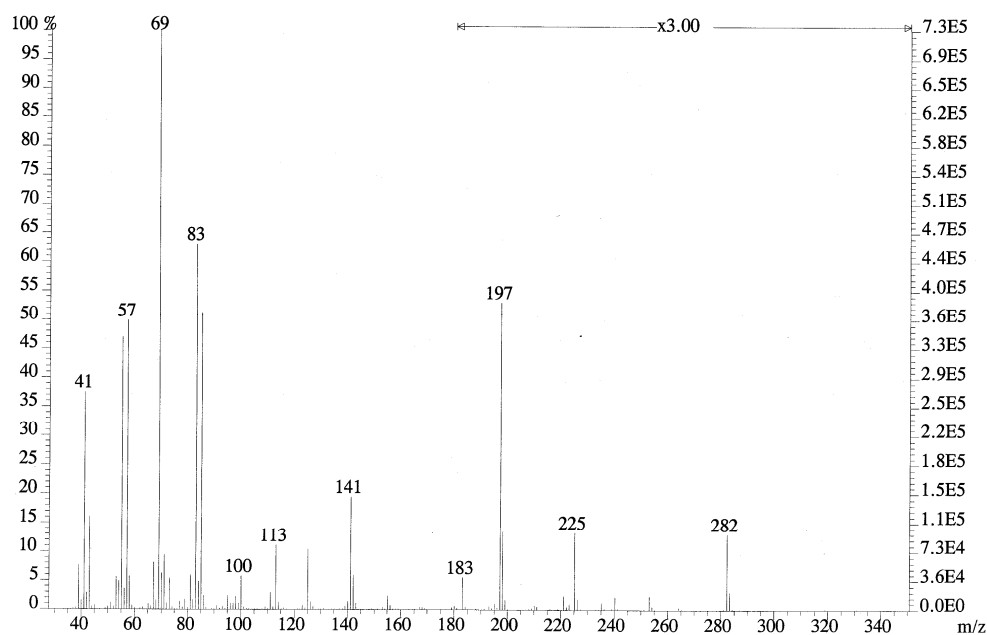
**Figure S6** EI-MS fragmentation pattern of the  $\alpha,\alpha$ -dehydromer (**B1**), formed during the autoxidation of nonan-5-one at 120 °C, 537 kPa oxygen



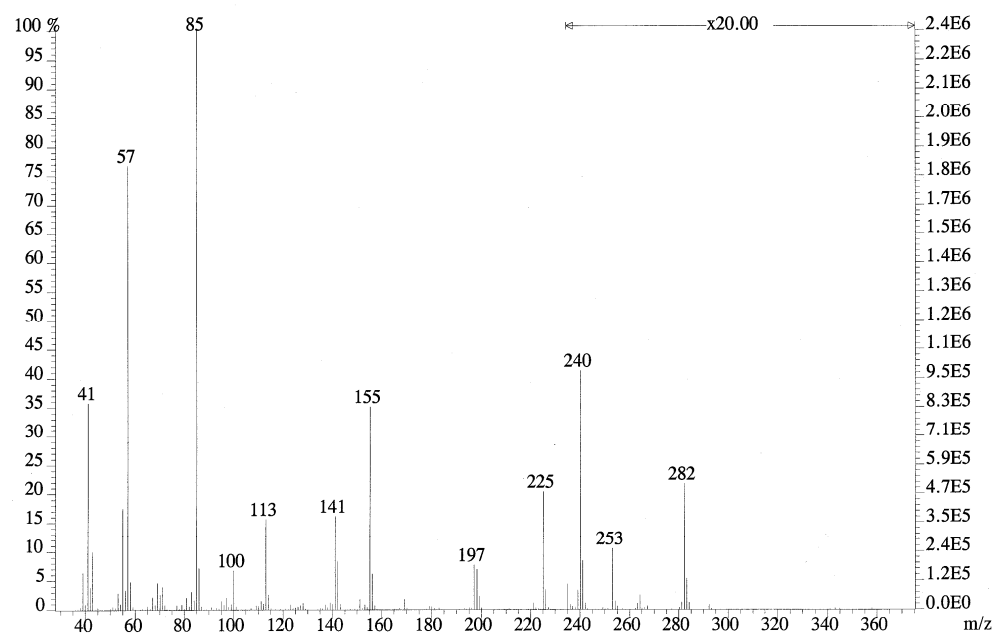
**Figure S7** EI-MS fragmentation pattern of the  $\alpha,\alpha$ -dehydrodimer (**B2**), formed during the autoxidation of nonan-5-one at 120 °C, 537 kPa oxygen.



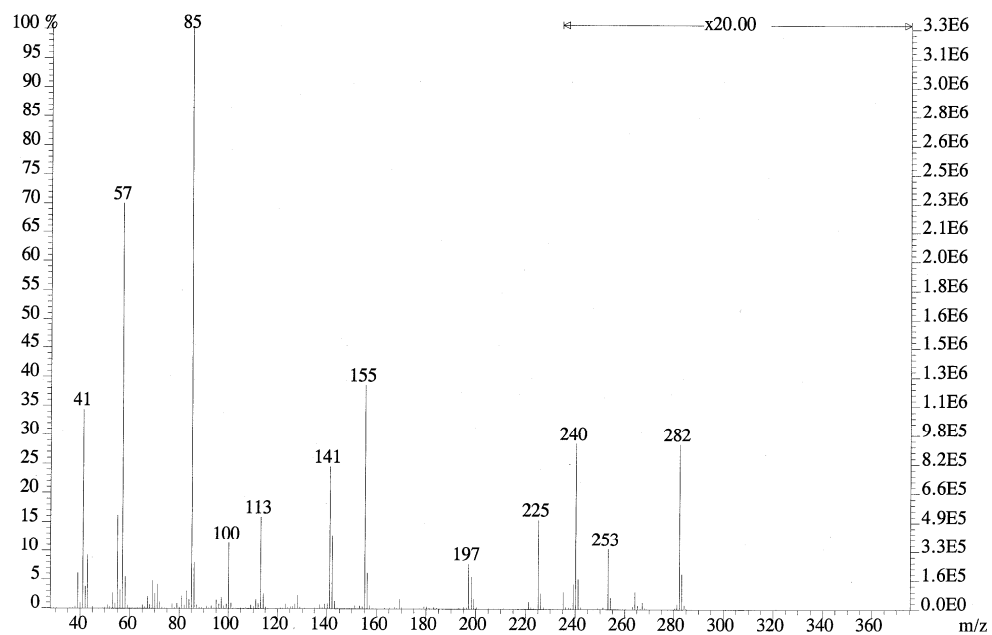
**Figure S8** EI-MS fragmentation pattern for ketone dehydrodimer **A1**, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen



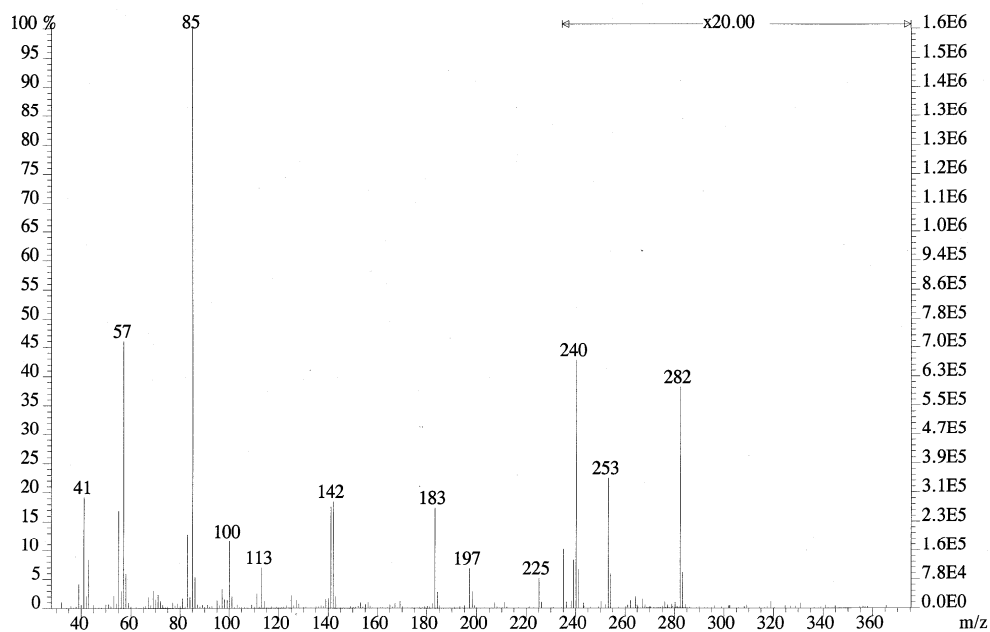
**Figure S9** EI-MS fragmentation pattern for ketone dehydromer **A2**, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen



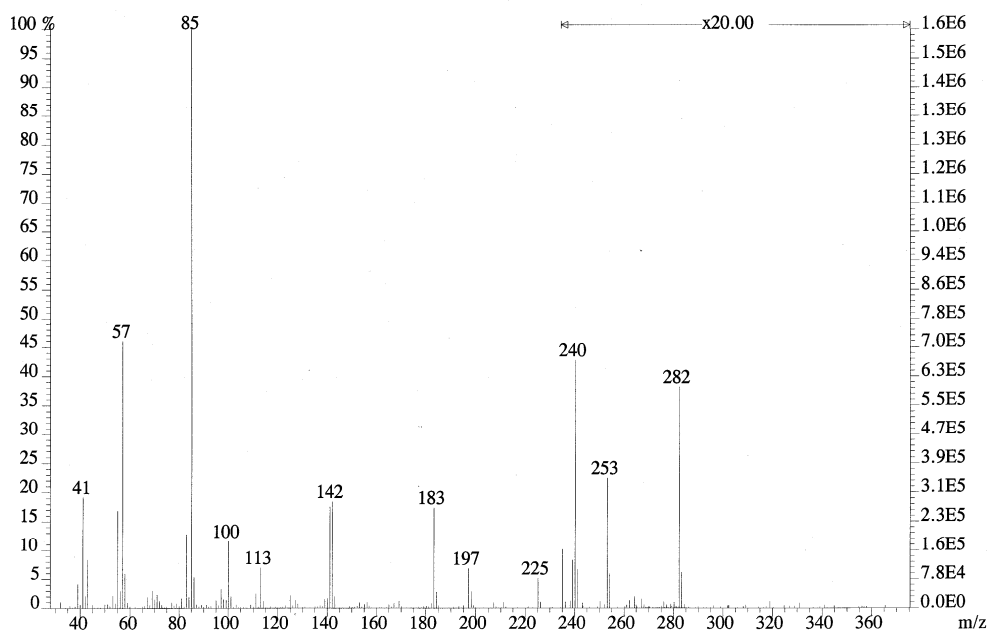
**Figure S10** EI-MS fragmentation pattern for ketone dehydromer **B1**, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen



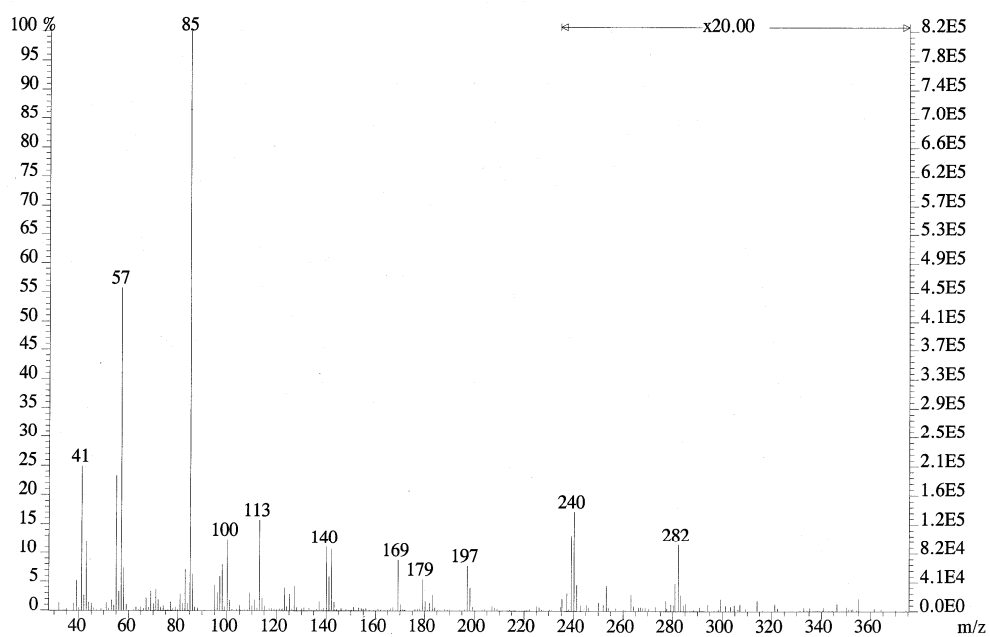
**Figure S11** EI-MS fragmentation pattern for ketone dehydrodimer **B2**, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen



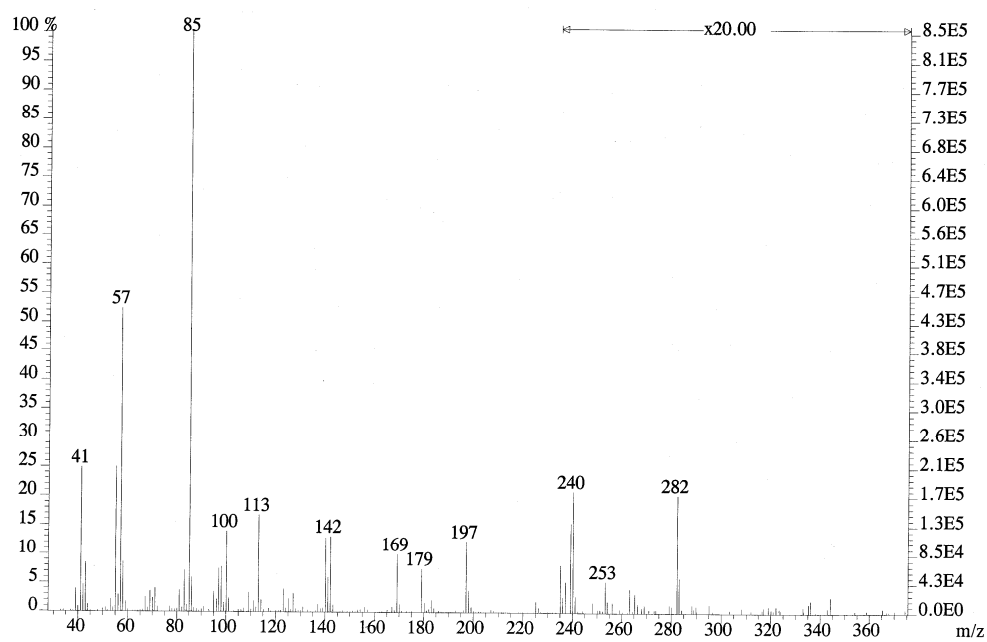
**Figure S12** EI-MS fragmentation pattern for ketone dehydrodimer **C1**, formed during the thermolysis of DTBP in nonan-5-one at 160 °C, under nitrogen



**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