

# Kinetic and product study of the gas phase of $\beta$ -ocimene with OH radicals

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## Abstract

$\beta$ -Ocimene is an acyclic monoterpene and its emission has been detected in plants such as wheat (1), pine (2), grass land (3) and tropical forest (4). In the troposphere the biogenic volatile organic compounds (BVOCs) undergo gas-phase reactions with OH radicals, NO<sub>3</sub> radicals and O<sub>3</sub> leading to the formation of variety groups of product species and participate in the formation of tropospheric ozone and particulate matter (5). In this study, the rate coefficients for the gas-phase reaction of OH radicals with  $\beta$ -ocimene were measured using the relative rate method over the temperature range 288-311K at 760 Torr. The experiments were performed in a long-path atmospheric chamber coupled to Fourier transformed infrared spectroscopy. The room temperature rate coefficient obtained is  $k_{(\beta\text{-ocimene} + \text{OH})} = (2.36 \pm 0.54) \times 10^{-10} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$ . The Arrhenius expression determined for the studied reaction is  $k = (4.02 \pm 0.71) \times 10^{-14} \exp(2567 \pm 211)$ . In addition, product studies have been performed at (298 $\pm$ 2) K and 760 Torr in the absence and in the presence of NO<sub>x</sub>. The yields of the reaction products are: formaldehyde (16.5  $\pm$  0.9)% and (24.3  $\pm$  1.5)% , acetone (45.6  $\pm$  2.1)% and (58.3  $\pm$  3.4)%, methyl vinyl ketone (18.5  $\pm$  0.8)% and <5% and glycolaldehyde (7.6  $\pm$  0.6)% and <5% in the absence and in the presence of NO<sub>x</sub> , respectively. Whereas the acetic acid (<5%) was only found in the reaction performed in the absence of NO<sub>x</sub> and peroxy acetyl nitrate was formed with a yield <5% in the presence of NO<sub>x</sub>. Mechanisms are proposed and atmospheric implications are discussed.

## References

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