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印红玲,袁桦蔚,叶芝祥,李世平,梁金凤.成都市大气中挥发性有机物的时空分布特征及臭氧生成潜势研究[J].环境科学学报,2015,35(2):386-393

成都市大气中挥发性有机物的时空分布特征及臭氧生成潜势研究

Temporal and spatial distribution of VOCs and their OFP in the atmosphere of Chengdu关键词: [VOCs](#) [时空分布](#) [功能区](#) [臭氧](#)基金项目: [四川省教育厅重点项目\(No.13Z197\)](#); [成都信息工程学院大气污染控制与环境模拟省重点实验室开放项目\(No.KFKT201305\)](#)

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摘要: 对成都市2011-2012年期间大气中的VOCs在不同季节、不同功能区及不同高度的浓度和组成进行了SUMMA钢罐采样法监测与实验室分析,并讨论其臭氧生成潜势。结果表明:采样期间成都市大气中VOCs的季节变化为:秋季($106.0 \mu\text{g}\cdot\text{m}^{-3}$)>夏季($74.5 \mu\text{g}\cdot\text{m}^{-3}$)>春季($54.1 \mu\text{g}\cdot\text{m}^{-3}$)>冬季($45.8 \mu\text{g}\cdot\text{m}^{-3}$)。烷烃、酯类、醇类日变化规律呈单峰型,峰值在8:00出现,与交通流量的变化有关;烯烃和芳香烃的日变化规律则呈双峰型。烷烃、烯烃、芳香烃、醇类在不同功能区的浓度顺序为:交通居民混合区>工业区>风景区,而醛酮类则为:工业区>交通居民混合区>风景区。在垂直方向上,距地面78 m处TVOCs浓度最高,这可能与当时采样期间大气为逆温层结有关,其中,烷烃、芳香烃为主要组分。不同VOCs的平均臭氧生成潜势(OFP)及其贡献率排序为:芳香烃(75.5%)>烯烃(23.8%)>烷烃(0.8%);不同功能区的OFP排序为:交通居民混合区>工业区>风景区。

Abstract: Atmospheric VOCs in different areas and heights were collected by SUMMA canister sampling method and analyzed for their seasonal and diurnal variations as well as ozone formation potential (OFP). Their concentrations showed a seasonal pattern with the highest values in fall ($106.0 \mu\text{g}\cdot\text{m}^{-3}$), followed by summer ($74.5 \mu\text{g}\cdot\text{m}^{-3}$), spring ($54.1 \mu\text{g}\cdot\text{m}^{-3}$) and winter ($45.8 \mu\text{g}\cdot\text{m}^{-3}$). The diurnal patterns showed a peak at 8:00 am for alkanes, esters and alcohols mainly due to the traffic exhaust. In comparison, two peaks were observed for the diurnal variations of alkenes and aromatic hydrocarbons. Alkanes, alkenes, aromatic hydrocarbons and alcohols were found higher in traffic and residential mixed area, followed by industrial area and scenic area, while the highest concentrations of aldehydes and ketones were observed in industrial area followed by traffic/residential mixed area and scenic area. The highest concentrations of total VOCs with the most abundant composition of alkanes and aromatic hydrocarbons were found at the height of 78 m in the vertical profile, mostly likely due to the formation of inversion layer. The average contribution of OFP for aromatic hydrocarbons, olefins and alkanes was 75.5%, 23.8% and 0.8%, respectively. The highest OFP of TVOCs was found in traffic/residential mixed area, followed by industrial area and scenic area.

Key words: [VOCs](#) [temporal and spatial distribution](#) [function area](#) [ozone](#)

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