

油品改善与人体健康 Fuel Quality Improvement and Public Health

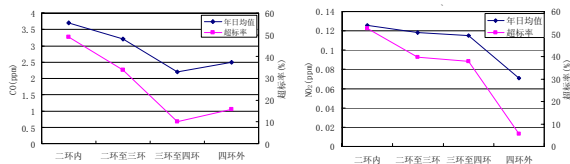
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机动车污染威胁人体健康

Vehicle Pollution Threatens Health

- 机动车污染对城市空气质量的恶化有很大影响
Vehicle emissions contribute greatly to the deterioration of urban air quality.
- 人口活动水平较高的城市中心区域由于车流量大、交通拥堵，人体暴露的影响尤为严重
The downtown area is a high human exposure zone where heavy traffic and concentrated human activity coexist.

高暴露微环境 High Exposure Microenvironment

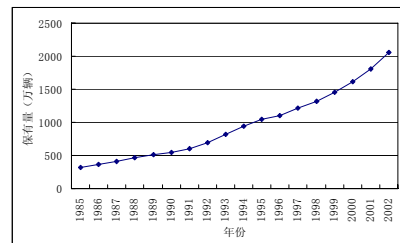


Roadside Air Quality (Beijing, 2003)

Intake fraction 30 times higher than power plants!

中国民用汽车拥有量

Personal Vehicle Population of China



车辆拥有量和车用燃油消耗仍将保持持续快速的生长
Vehicle population and fuel consumption continue to increase

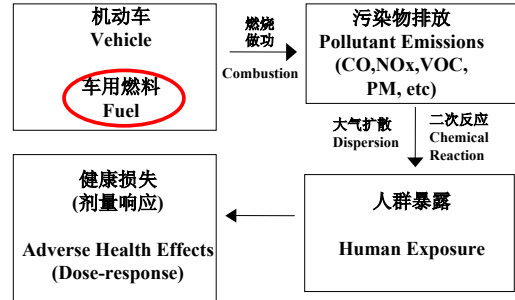
污染物对人体健康的影响

Adverse Health Effects of Different Pollutants

污染物	主要危害
Pb	阻碍儿童智力和身体的发育, 引起阅读和理解上的障碍 影响成年人心血管系统, 与高血压及心肌梗塞病症相关性较高
CO	阻止血红蛋白向人体组织输送氧气, 使体内缺氧 长期处于低浓度污染状态, 可患动脉硬化、脑溢血和末梢神经炎等疾病, 对胎儿和幼儿的生长发育有很大的影响
NO _x	刺激呼吸道, 导致肺功能下降
PM	主要影响心脏和呼吸系统疾病
HC	当中的有毒物质有很强的致癌作用
Ozone	臭氧对呼吸系统有很大的影响, 如胸痛、咳嗽、呼吸不畅等 会损害肺部机能

对人体健康的影响链

Adverse Health Impacts Chain



油品改善对健康影响

Fuel Quality Impacts Health

- 汽油无铅化使得大气中的铅含量明显下降, 儿童体内的血铅水平明显下降
Unleaded gasoline has decreased the lead concentration in the ambient atmosphere. The blood lead levels of children has declined.
- 油品改善配合三元催化转化器的广泛使用, 在一定程度上控制了机动车污染恶化的势头。
Fuel quality improvement and “three-way catalytic converter” application helped to control the deterioration of vehicle pollution.

对油品质量改善的需求

Need for Fuel Quality Improvement

- 污染形势依然严峻, 高暴露微环境尤其值得关注
Vehicle pollution is still serious and more attention should be paid to high exposure microenvironment.
- 中国开始对轻型车和重型采取欧洲二号标准, 目前正在制定欧洲三号 and 四号标准
China has adopted Euro II for Light Duty Vehicles and Heavy Duty Vehicles. Euro III and Euro IV are under consideration.

对油品质量改善的需求 Need for Fuel Quality Improvement

- 油品改善是加严机动车排放标准和采用更先进的机动车排放控制技术的先决条件
Better fuel quality is the prerequisite for advanced vehicle technology and thus lower emissions.
- 改善车用燃油品质同时也是控制在用车排放的有效手段，其优势在于能迅速对整个车队产生效果
Fuel quality improvement is an effective tool for controlling vehicle emissions.

汽油 Gasoline

- 通过降低汽油的饱和蒸气压，可以迅速降低整个车队的蒸发排放
By reducing vapor pressure, the emissions of in-use vehicles can be reduced.
- 通过汽油组分的改良，可以降低尾气排放的光化学活性，减低臭氧带来的健康损失
By modifying its composition, the reactivity of exhaust can be reduced and adverse health effects decreased.

汽油 Gasoline

- 汽油调和组分/硫含量的控制有助于削减机动车有毒物质的排放
Changing its composition/sulfur reduction can reduce toxic emissions.
- 在选用汽油添加剂的时候需要谨慎以防止对人体健康产生意想不到的负面影响
We must be cautious in using gasoline additives to avoid unexpected adverse health effects.

汽油 Gasoline

GB 17930—1999车用无铅汽油标准 vs. 欧洲油品

GB 17930—1999 Unleaded Gasoline Standard vs. European Standards

指标	单位	Euro-III, IV		Euro-I, II		GB 17930	
		Min.	Max.	Min.	Max.	Min.	Max.
RVP	kPa	56.0	60.0	56	64		88 74
馏程							
T10	°C			42	58		70
T50	°C			90	110		120
T90	°C			155	180		190
烯烃	% v/v		10		20		35
芳香烃	% v/v	28.0	40.0		40		40
苯	% v/v		1.0		5.0		2.5
硫	mg/kg		100		400		800

柴油 Diesel

- 降低硫含量可以直接降低在用车颗粒物排放
Particle matter (PM) emissions can be decreased by reducing the diesel sulfur content.
- 柴油品质的改善使得一些较为成熟的针对在用柴油车/发动机的排放改造技术的应用成为可能
Fuel quality improvement will enable the application of some good diesel vehicle/engine retrofit technologies for in-use vehicles.
- 如氧化型催化转化器和催化型颗粒物捕集器等
Examples: oxidation catalyst and catalytic PM filters

柴油 Diesel

GB 19147-2003车用柴油标准 vs. 欧洲油品
GB 19147-2003 Diesel Fuel Standards vs. European Standards

指标	单位	EU-III, IV		EU-I, II		GB 19147	
		Min.	Max.	Min.	Max.	Min.	Max.
十六烷值		52.0	54.0	49	53	45-49	
馏程:							
- T50	°C	245		245			300
- T90	°C			320	340		355
- T95	°C	345	350				365
闪点	°C	55		55		45-55	
硫	mg/kg		300		500		500
氧化安定性	mg/ml		0.025		0.025		0.025

替代燃料 Alternative Fuels

- 对在城市核心区域行驶频率较高的运营车辆考虑进行替代燃料转换
Alternative fuel conversion should be considered for commercial fleets in urban center areas.
- 关注颗粒物排放的粒径分布与组成，尤其是对人体健康更为有害的细颗粒物
Concerns: size, distribution, and composition of PM emissions, especially for fine particles which have more significant adverse health effects.

替代燃料 Alternative Fuels

- 关注污染物排放的臭氧生成潜势 / 光化学活性
Concerns: photochemical reactivity, ozone generation potential
- 根据城市的实际特点选取合适的替代燃料类型，最大限度的降低对人群健康的影响
Select the appropriate alternative fuel types based on each city's needs and reduce the adverse health effect to the maximum extent.

总结

Conclusion

- 为了降低机动车排放对人体健康的影响，必须继续改善油品质量

To reduce the adverse health effects of vehicle emissions, vehicle fuel quality must continue to be improved.

- 对机动车排放的污染物进行更细致的分析和控制，包括颗粒物粒径分布和成分、有毒物质排放、尾气光化学活性等，这也给油品提出了更高的要求

More detailed analysis and control is required of PM size distribution and composition, toxic emissions and exhaust reactivity. This has put higher requirements on fuel quality.

总结

Conclusion

- 政府必须将对人体健康影响的考虑全面融入制定油品标准的整个过程和与车用燃油相关的项目中

The impact on public health must be incorporated into the entire process of developing fuel quality standards and alternative fuel programs.

- 清洁油品的增加成本是相对较小的 Cost marginal

- 政府必须制定有利于清洁燃料/替代燃料的相应税收政策-市场经济规律！

Tax incentives must be taken by the government to promote clean fuel/ alternative fuels where appropriate