

## Editorial

# Methane and Hydrocarbons

Shale gas has received much attention in recent years particularly in the USA and in Europe. It is a useful fuel source but also comes with the attendant risks and challenges associated with maximising the useful extraction of fuel, minimising costs and also protecting the environment. Its constituent component is essentially methane, the same as any other source of natural gas and it is this which makes itself useful in a variety of ways as a fuel and feedstock.

The extraction of unconventional gas as well as unconventional oil requires new technologies, with one of the challenges being to develop the most economical extraction process, given the large investments required. Tracerco, a Johnson Matthey company, provides solutions to this problem with its tracer technologies and an article outlining a case study of their application is included in this issue (1).

Methane, the major component of both shale gas and conventionally derived natural gas, also occurs in a number of other applications and it is not always welcome.

## Extracting Methane

One such example is methane found during coal mining activities. While some forms of methane are able to be extracted in useful form (coal bed methane and to some extent coal mine methane also) there is a third type, ventilation air methane, present at concentrations of less than 1% and which is not currently economical to extract for use. At the same time this low level methane constitutes the largest amount, in tonnage terms, of the methane emissions from coal mining. To mitigate this Johnson Matthey Davy Technologies Ltd (JM Davy) has developed the technology known as COMET™ which is discussed in another of the articles in the present issue, by Ian Mitchell *et al.* (2).

A UK-based development and process engineering

company, JM Davy licenses its proprietary process technologies worldwide for the oil, gas and chemicals industries. It also has a research and development (R&D) centre located in the Tees Valley, UK, where it undertakes development, demonstration and process engineering to support its portfolio of processes, technologies and catalysts. It licenses processes and their individual core technologies to clients who wish to build a new plant or make a new product.

## Emissions Abatement

Natural gas can be used as a fuel in various sorts of engines both mobile (typically vehicle combustion engines in the form of compressed natural gas (CNG) fuel) and stationary engines. Although today's engines are increasingly efficient there is a small amount of escape into the vehicle exhaust and this must be mitigated with an emissions control solution. A forthcoming article in this journal will look at ways in which these emissions can be eliminated when used in various engine types.

## Collaborative Programmes

Methane is well known as an unreactive hydrocarbon meaning that it is challenging to process.

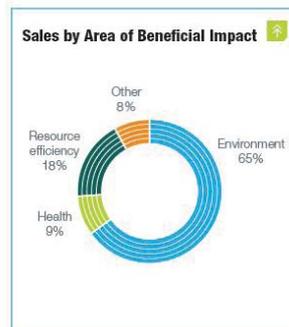
A number of European funded projects have been set up looking at ways to more efficiently process methane as well as other hydrocarbons, whether sourced from fossil reserves or from biomass. The improvement of such processing will be crucial to the sustainable future of many industries and an article in this issue, derived from one of the European projects 'Catalytic Membrane Reactors Based on New Materials for C1-C4 Valorization' (known as CARENA) details some of the work undertaken within Johnson Matthey in the context of this programme (3).

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- Improve air quality and reduce emissions.
- Conserve natural resources.
- Enhance quality of life.

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**£3.2 billion**
- Underlying profit before tax  
**£418 million**
- **92% sales**  
from products with sustainability benefit



**OUR SKILL LIES IN UNDERSTANDING CHEMISTRY AND ITS APPLICATIONS**

Summary of Johnson Matthey business areas (Source: Johnson Matthey Annual Report and Accounts 2016, © 2016 Johnson Matthey Plc)

Overall Johnson Matthey is well placed to offer a number of solutions to areas of industry which deal with the difficult challenges posed by methane and other hydrocarbons, whether as a fuel, feedstock, or unwanted emissions. As part of its commitment to sustainable industry and the sustainable use of resources, it drives innovation through its R&D activities towards this goal.

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## References

1. J. Spencer, *Johnson Matthey Technol. Rev.*, 2016, **60**, (3), 186
2. P. Hinde, I. Mitchell and M. Riddell, *Johnson Matthey Technol. Rev.*, 2016, **60**, (3), 211
3. M. Rivas Velazco and W. McDonnell, *Johnson Matthey Technol. Rev.*, 2016, **60**, (3), 222