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Air Quality Challenges/Opportunities from an Industry Perspective

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This presentation contains forward-looking statements. Examples of such forward-looking statements include, but are not limited to: (i) statements regarding the Group's results of operations and financial condition, (ii) statements of plans, objectives or goals of the Group or its management, including those related to financing, products or services, (iii) statements of future economic performance; and (iv) statements of assumptions underlying such statements. Words such as "believes", "anticipates", "expects", "intends", "forecasts" and "plans" and similar expressions are intended to identify forward-looking statements but are not the exclusive means of identifying such statements. By their very nature, forward-looking statements involve inherent risks and uncertainties, both general and specific, and risks exist that the predictions, forecasts, projections and other forward-looking statements will not be achieved. The Group cautions that a number of important factors could cause actual results to differ materially from the plans, objectives, expectations, estimates and intentions expressed in such forward-looking statements. These factors include, but are not limited to: (i) future revenues being lower than expected; (ii) increasing competitive pressures in the industry; (iii) general economic conditions or conditions affecting demand for the services offered by us in the markets in which we operate, both domestically and internationally, including as a result of the Brexit referendum, being less favorable than expected; (iv) worldwide economic and business conditions and conditions in the industries in which we operate; (v) fluctuations in the cost of raw materials and utilities; (vi) currency fluctuations and hedging risks; (vii) our ability to protect our intellectual property; and (viii) the significant amount of indebtedness we have incurred and may incur and the obligations to service such indebtedness and to comply with the covenants contained therein. The Group cautions that the foregoing list of important factors is not exhaustive. These factors are more fully discussed in the sections "Forward-Looking Statements" and "Risk factors" in our Annual Report on Form 20-F for the year ended December 31, 2017, filed with the U.S. Securities and Exchange Commission on March 19, 2018. When relying on forward-looking statements to make decisions with respect to the Group, investors and others should carefully consider the foregoing factors and other uncertainties and events. Such forward-looking statements speak only as of the date on which they are made, and the Group does not undertake any obligation to update or revise any of them, whether as a result of new information, future events or otherwise.

GAS CYLINDERS DIVISION: KEY PRODUCTS

ALUMINUM CYLINDERS

Luxfer is the world's largest manufacturer of high-pressure aluminum gas cylinders

Key applications

- Industrial gas
- Fire extinguishers
- Scuba diving

COMPOSITE CYLINDERS

Luxfer is the world's largest manufacturer of high-pressure composite cylinders

Key applications

- SCBA - Self-Contained Breathing Apparatus
- Healthcare

ALTERNATIVE FUEL CYLINDERS

Luxfer is a major supplier of composite cylinders for compressed natural gas and hydrogen

Key applications

- Buses & Trucks
- Bulk Gas transport
- Hydrogen

SUPERFORM COMPONENTS

Luxfer invented the superforming process for complex, sheet-based components from aluminum, magnesium and titanium

Key applications

- Automotive
- Aerospace
- Rail

Leading Positions in Niche Applications

ELEKTRON DIVISION: KEY PRODUCTS

MAGNESIUM ALLOYS

Luxfer is a global innovation leader in the use of magnesium for unique, high-performance alloys and powders

Key applications

- Aerospace alloys
- Industrial alloys

ZIRCONIUM-BASED CHEMICALS

Luxfer is a global producer of inorganic, zirconium-based solutions used for industrial and automotive applications

Key applications

- Automotive catalysis
- Industrial catalysis

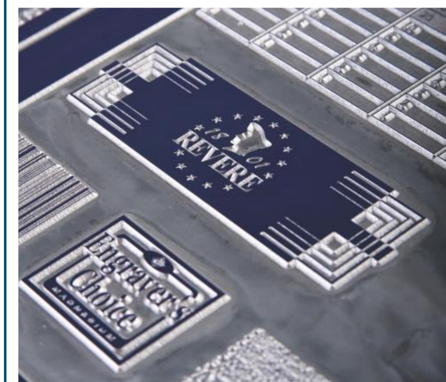
MAGTECH PRODUCTS

Luxfer makes magnesium-based heating pads for self-heating meals and also the key ingredient for aircraft decoy flares

Key applications

- Aircraft decoy flares
- Flameless meal heaters

GRAPHIC ARTS



Luxfer Graphic Arts products include magnesium, copper and brass plates for photo-engraving, embossing and foil stamping

Key applications

- Luxury packaging
- High-end labels & covers

Leading Positions in Niche Applications

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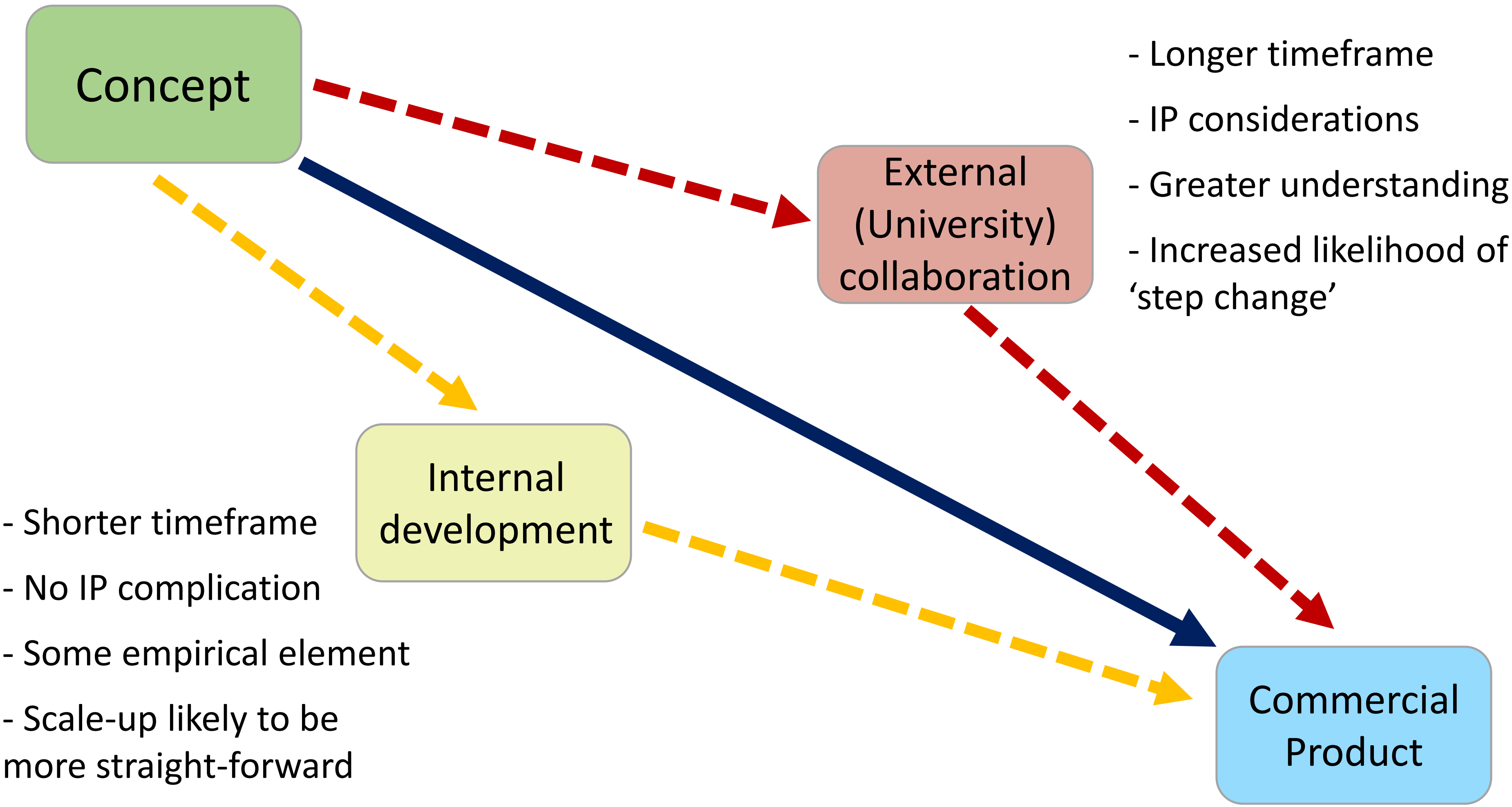
General Challenges In New Product Commercialisation

The Process of Commercialisation



Rapid [concept → commercial product] timing is preferable

Multi-Tier Industries

‘Ingredient’ manufacturer

Catalyst manufacturer

Car maker (OEM)

Controlled feedback between parties

- Understandable for IP reasons
- Hinders development

Multi-collaborative, “semi-altruistic” approach needed for rapid/step-change advancement

Many industries have >3 steps in the chain

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Specific Examples

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Hydrogen

Challenges

- Public money focused on electric propulsion – private money investing in the hydrogen vehicles
- Infrastructure e.g filling stations
- Hydrogen production
    - Green – from renewable = lowest carbon footprint

London's first double decker bus has a Luxfer H_2 cylinder system installed

The UK's first hydrogen powered prototype train has a Luxfer H_2 cylinder system installed

Luxfer is the leading supplier of H_2 cylinder systems for buses globally

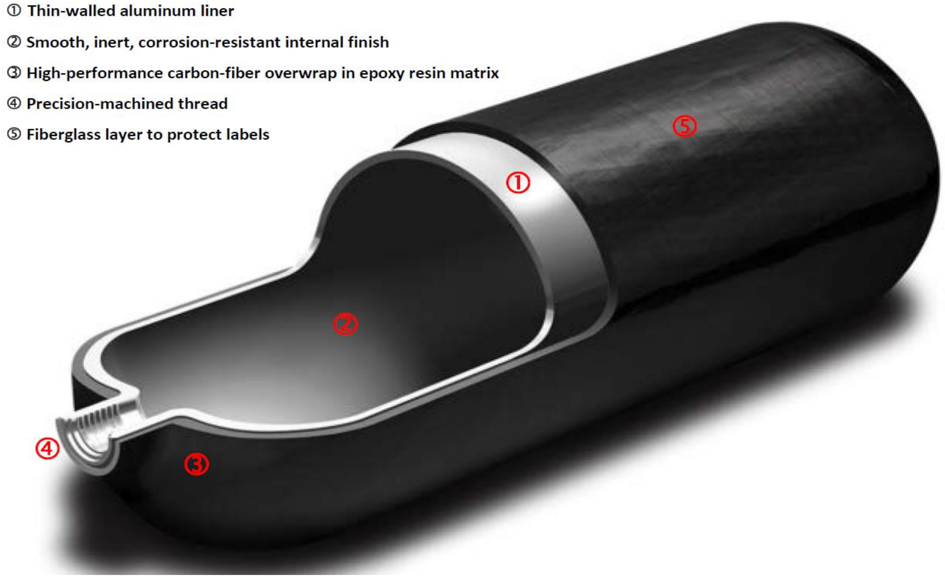
Luxfer H_2 cylinders are even used on drones

Demand for new innovative applications

Technology/Opportunities

Luxfer Gas Cylinders are heavily involved in the provision of systems and cylinders for hydrogen vehicles

- Type 3 (Aluminium Liner with Composite Carbon Wrap)



- Increased pressures
- Sizes to fit applications
- Luxfers expertise to create systems (from fill point to fuel cell)

The global leader in suppling alternative fuel cylinders for commercial vehicles

Sources of Emissions

Sources of Emissions within the UK

From DEFRA Clean Air Strategy 2019

** Reductions in emissions against 2005 baseline*

$PM_{2.5}$ (↓46% by 2030)	Ammonia (↓16% by 2030)	NOx (↓73% by 2030)	SO_2 (↓88% by 2030)	NMVOCs (↓39% by 2030)
Domestic wood/coal burning 38%	**Agriculture 88%**	**Road transport 34%** ***Near roadside 80%***	**Energy generation 37%**	**Industrial processes 22%**
Industrial combustion 16%		Energy generation 22%	Industrial combustion 22%	Household products 18%
Use of solvents & industrial processes 13%		Domestic and industrial combustion 19%	Domestic burning 22%	Agriculture 14% Transport 5%
Road transport 12%		Other transport 17%		Residential burning 5%

Major contributor is different for each pollutant

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Automotive Emissions - Drivers For Innovation

- Ever-tightening legislation (NOx, HC's, CO, PM, CO_2). Euro 7 (NH_3, HCHO)?
- More realistic drive-cycle (WLTP) and real-world driving RDE required for approval
- Evolution of engine technology (e.g. down-sizing, etc)
- Hybrid vehicles
- Political, e.g. uncertainty (Brexit) and influence ("diesel-gate")

Opportunities across multiple industries

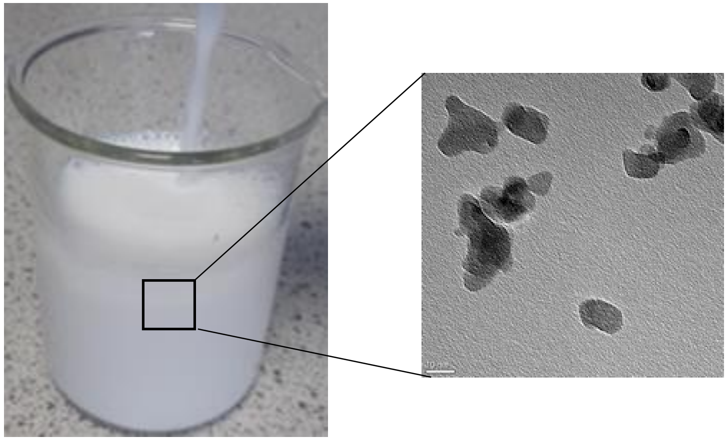
Powertrain

Catalytic converter

Emissions monitoring

e.g. Next generation materials required for catalytic converter

Filter Applications



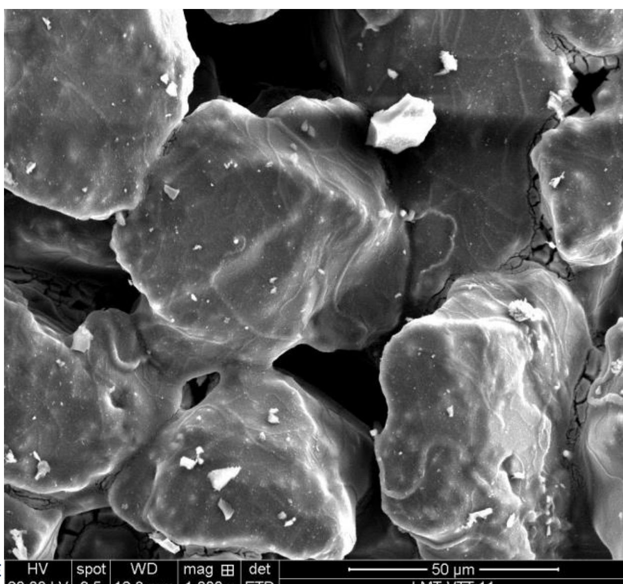
e.g. DPF and GPF

→ $6x10^{11}$ #/km Euro 6

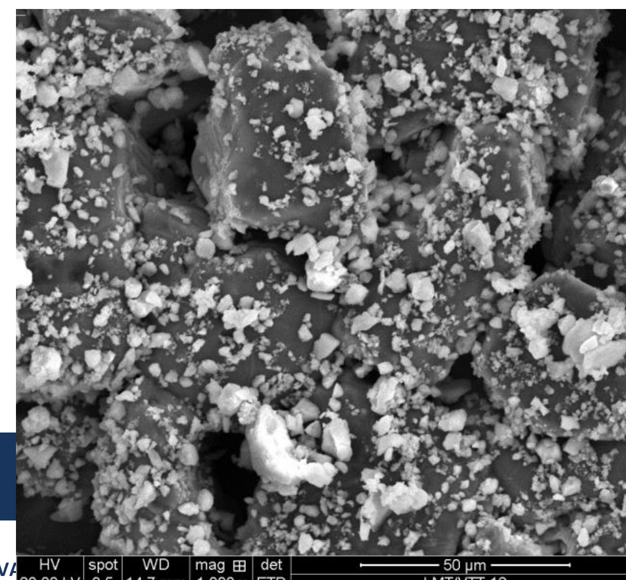
Back-pressure, filtration efficiency, pollutant conversion

- Aqueous dispersion of mixed oxide
- Contain no organic additives, or stabilizers
- Small particle size; Z-Average 100-300nm
- Low viscosity; <100cps

CePrZrOx (nano) on SiC filter



CePrZrOx (milled oxide) on SiC filter



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Other Emissions Sources

Marine

Major pollutant types:

- SOx
- NOx
- Particulates

Sulphur content of fuel
Permitted after 2020

Inside SOx ECAs: **0.10%**
Outside SOx ECAs: **0.50%**

Opportunities for biofuels

- Negligible Sulphur content
- Implications for other emissions (e.g. particulates)
- Scale required

→ Innovation in all areas of process (biomass conversion catalyst)

Catalysed filters on vessels? (S-tolerant coating technology)

Prevention vs cure

Electrification

Many governments indicating a complete phasing out of the internal combustion engine

- No sales of new vehicles in the UK after 2040

Battery-powered electric vehicles

- Build, operate and maintain charging infrastructure (private sector?)
- Deficit in power supply
- Current raw materials (e.g. Cobalt)
- Disposal/end of life
- Safety (Li-ion battery) → solid state electrolytes

Also need a fundamental change in population's lifestyle

Ambitious targets. Multiple component systems

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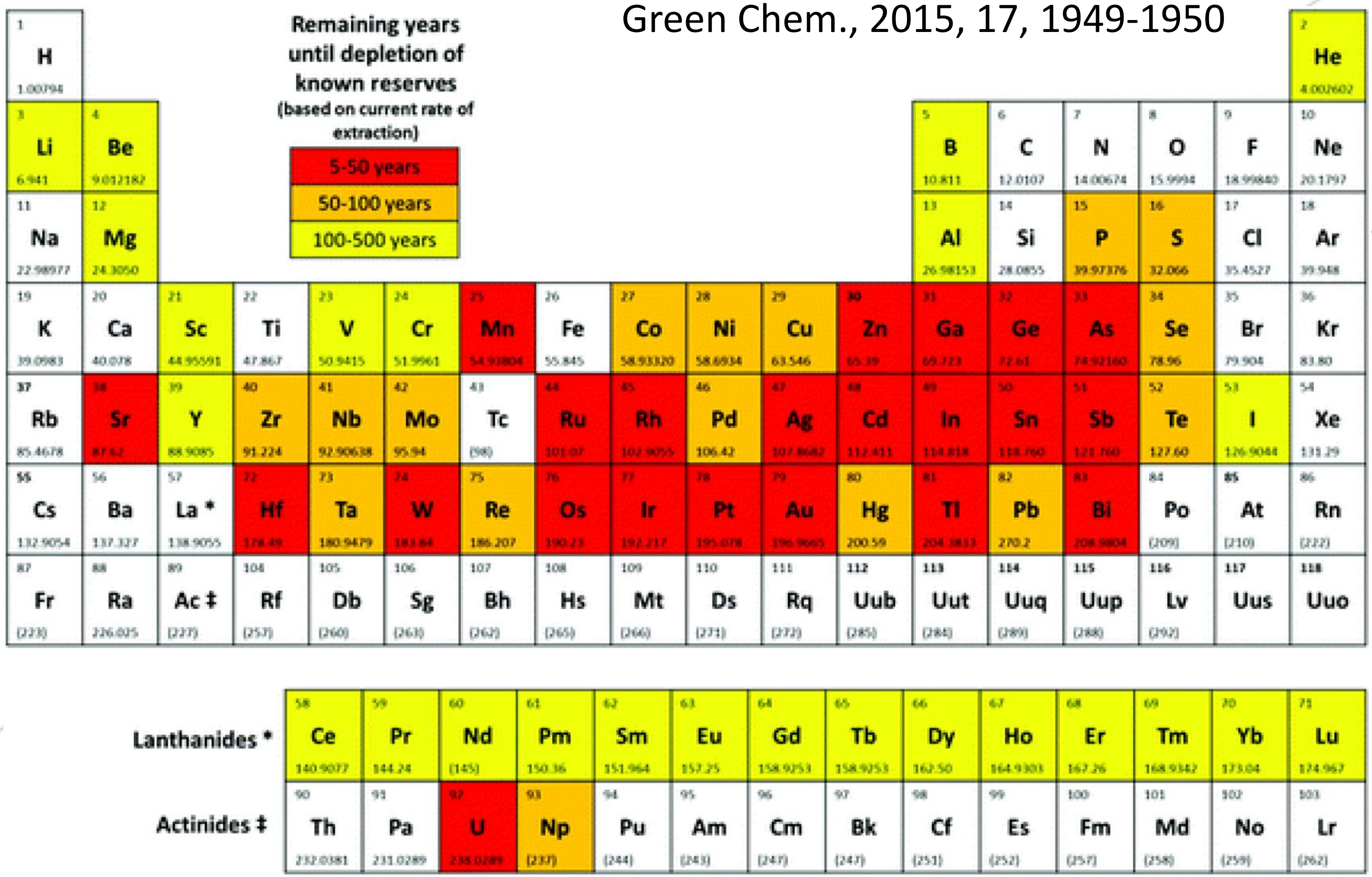
Finite Resources

Catalyst/Technology Raw Materials

Green Chem., 2015, 17, 1949-1950



Expansion of recycling portfolio as it becomes more economical to do so

PGM vs Base Metals

Platinum Group Metals (PGMs)

- Pt, Pd, Rh, Ru, Ir, Os
- Used in wide variety of catalytic reactions (primarily autocatalysis)

PGM Advantages	PGM Disadvantages
High activity	Expensive
Resistance to poisoning	Limited supply
Thermal durability	

Can base metal catalysts achieve equivalent performance to PGM's

- Or at least enable reduced PGM usage

Reactions at ambient temperature (e.g. indoor air quality)?

Although with phasing out of ICE, will there be a surplus of PGM's?

PGM Supply and Demand

Pt Supply (T)	2014	2015	2016	2017	2018
New supply	160	190	190	190	190
Recycle	64	53	60	64	69
Gross demand	*247*	*255*	*254*	*249*	*243*

Pd Supply (T)	2014	2015	2016	2017	2018
New supply	190	201	210	198	214
Recycle	85	75	77	90	100
Gross demand	*329*	*285*	*291*	*312*	*315*

Rh Supply (T)	2014	2015	2016	2017	2018
New supply	19.2	23.4	24.0	23.6	23.6
Recycle	9.4	8.1	8.4	9.7	10.7
Gross demand	*29.5*	*28.5*	*31.2*	*32.7*	*31.4*

Johnson Matthey PGM Market Report, Feb. 2019

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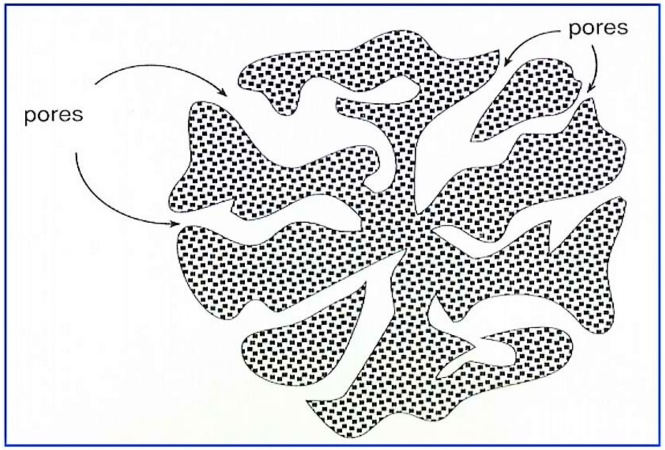
Adsorption

Pollutant Removal by Adsorption

Use of porous media to (reversibly) adsorb unwanted/harmful species

- Industrial processes
- Waste treatment/landfill sites
- Indoor/ambient air



Old concept, but with challenges/opportunities still present

- Removal of wide range of species (polar, organic, acidic, etc)
- Adsorption takes place under ambient conditions
- Sorbent can be regenerated
- If regenerated, what do we do with waste?

Conclusions

- Different emissions sources are primary emitters for different pollutants
  - Broad range of technologies required to solve all
- Legislation has been effective at driving automotive emissions reduction; further reduction possible through improved technology
  - Constant need for next generation/step-change materials
- Public/industrial "buy-in" with voluntary implementation of greener outlook is preferable (e.g. with some cost increase)
  - However, in reality legislation probably required in all aspects of improving air quality
- Prevention rather than cure, e.g. for SOx using biofuels
- Increased recycling of raw materials

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