

# Catalytic Hollow Fibre-Based Converters: the Key to a Nitrogen-based Fuel Economy

Claire Leishman

A. Codona | B. Duheric | F. R. García-García

The University of Edinburgh, School of Engineering, Sanderson Building, Robert Stevenson Road, EH9 3FB



## Why Green Ammonia?

70%

higher in energy density compared to hydrogen

ZERO Carbon

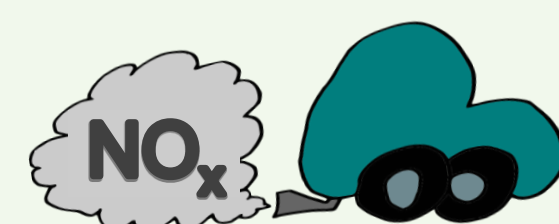
no CO<sub>2</sub>, CO, HC and PM emissions upon combustion



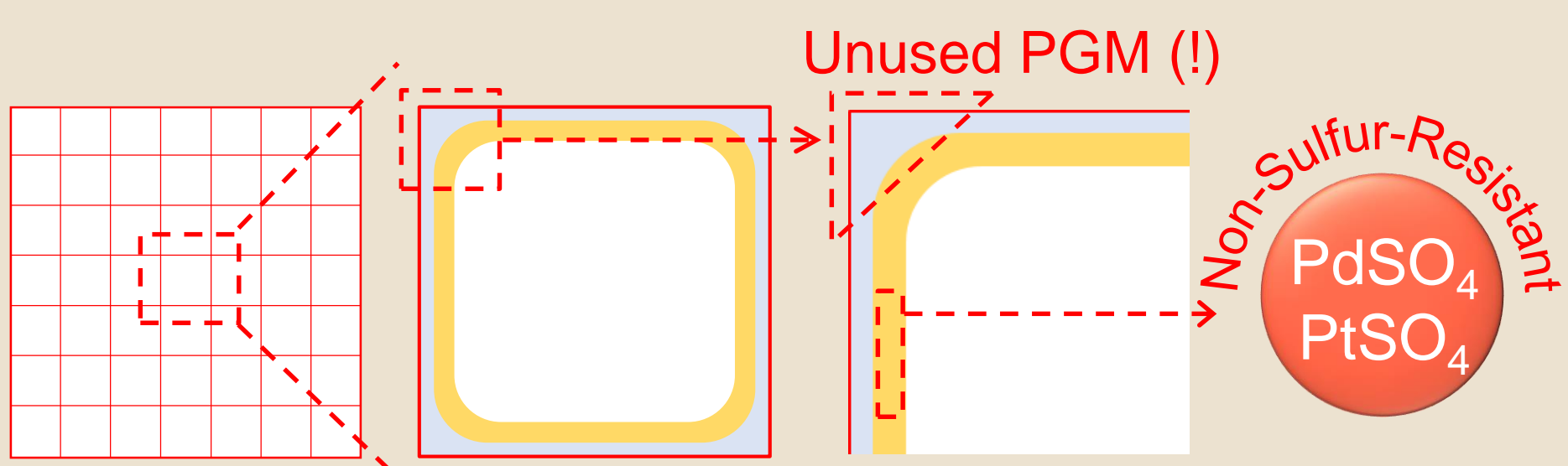
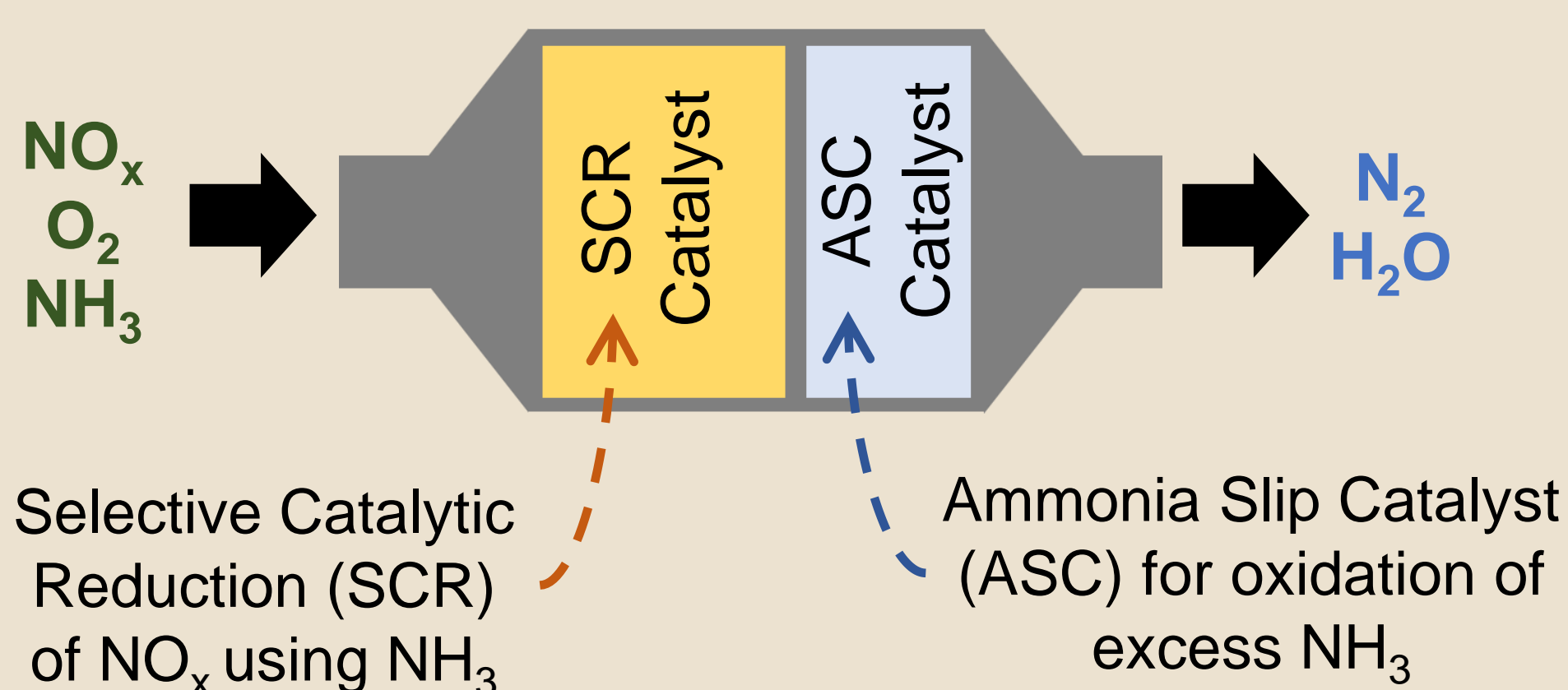
existing global transportation and storage infrastructure

## The Challenge

High NO<sub>x</sub> emissions associated with ammonia combustion



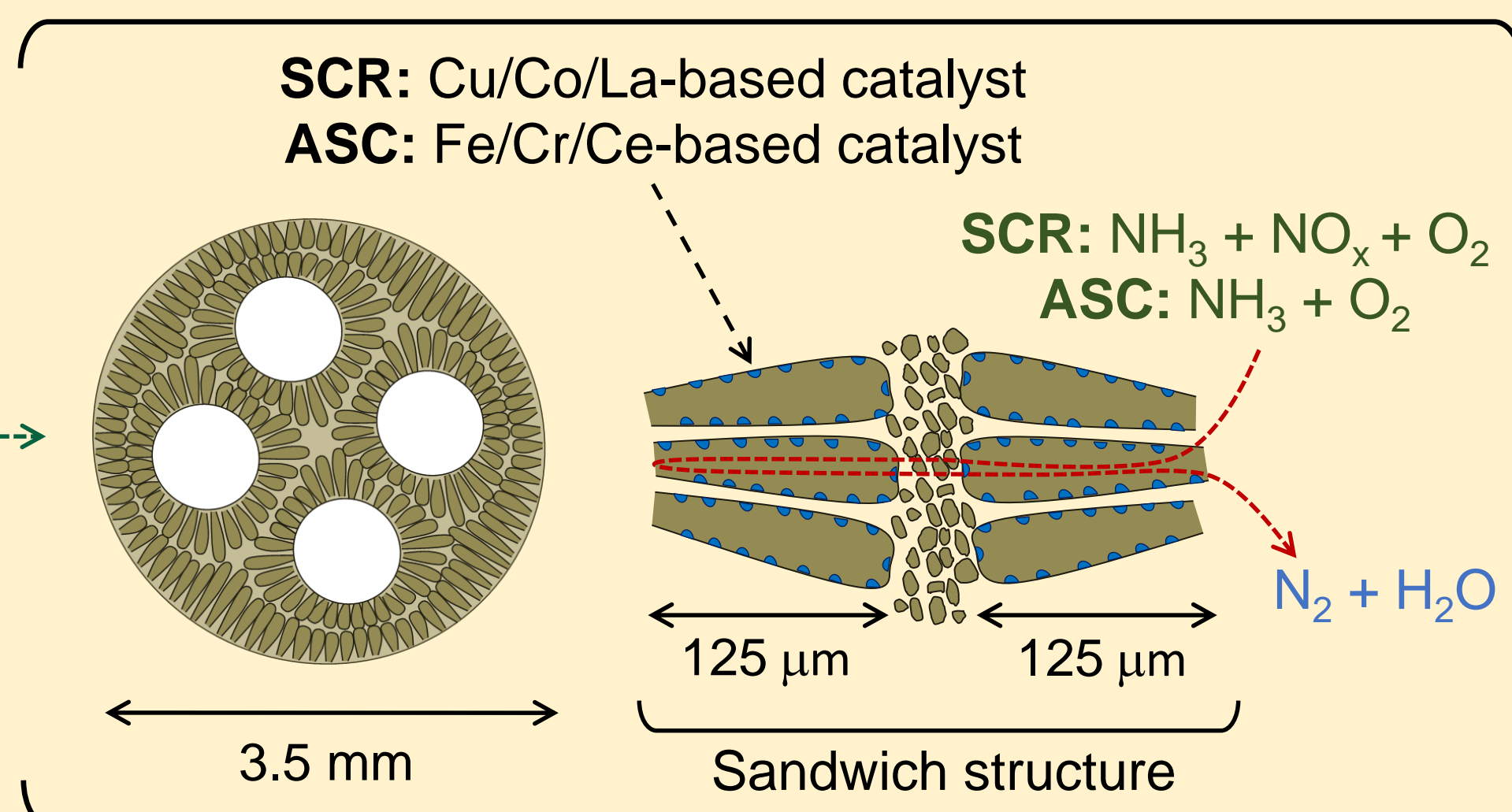
## Current: Traditional Catalytic Converters



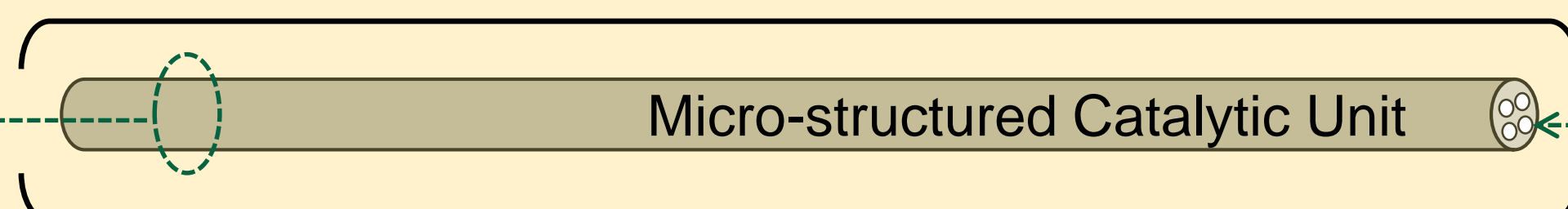
## Future: Catalytic Hollow Fibre-Based Converters

Novel catalytic hollow fibre-based catalytic converter, designed following a bottom-up approach: i) catalyst tailoring, ii) single unit, iii) bundle of units.

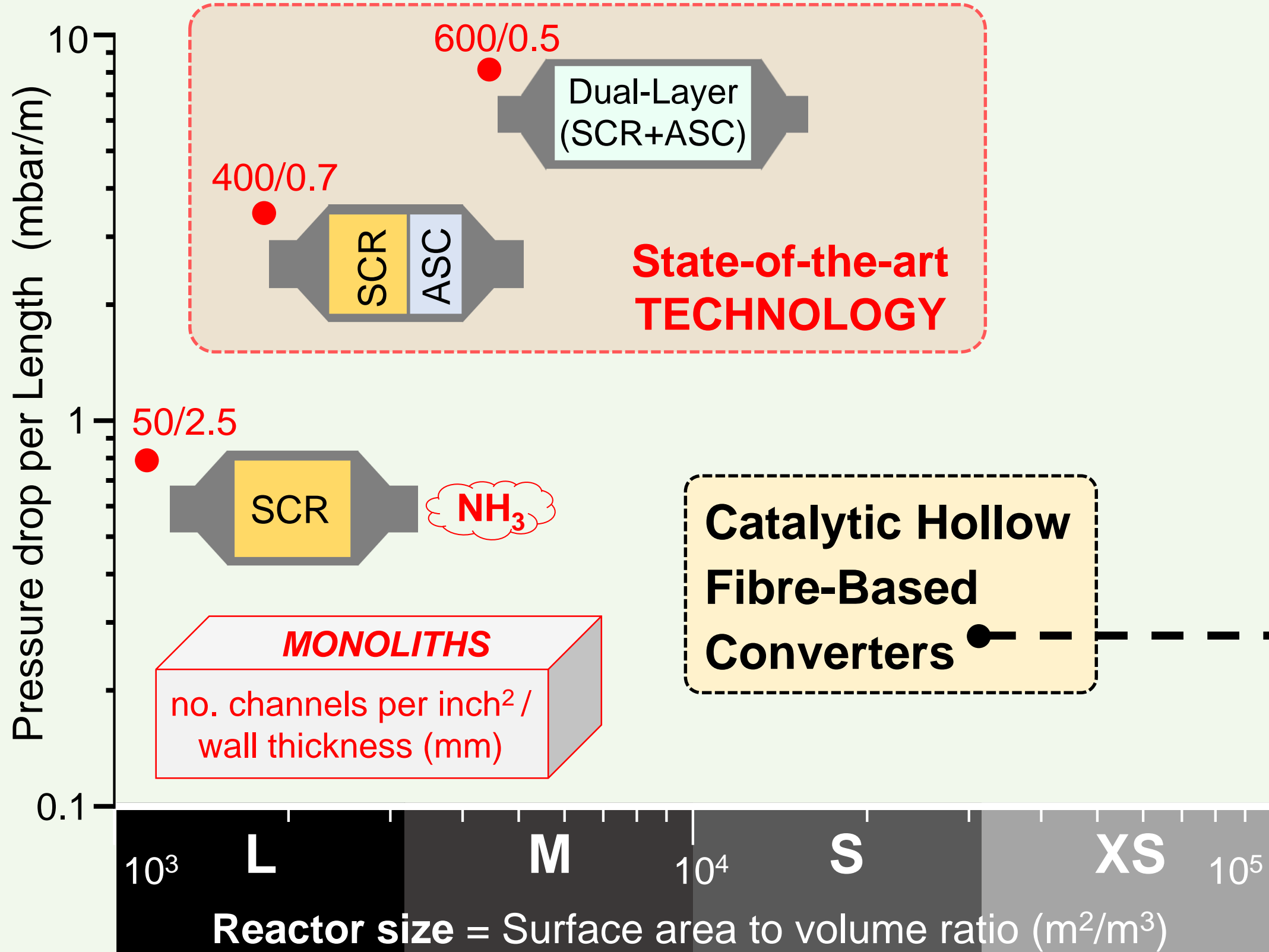
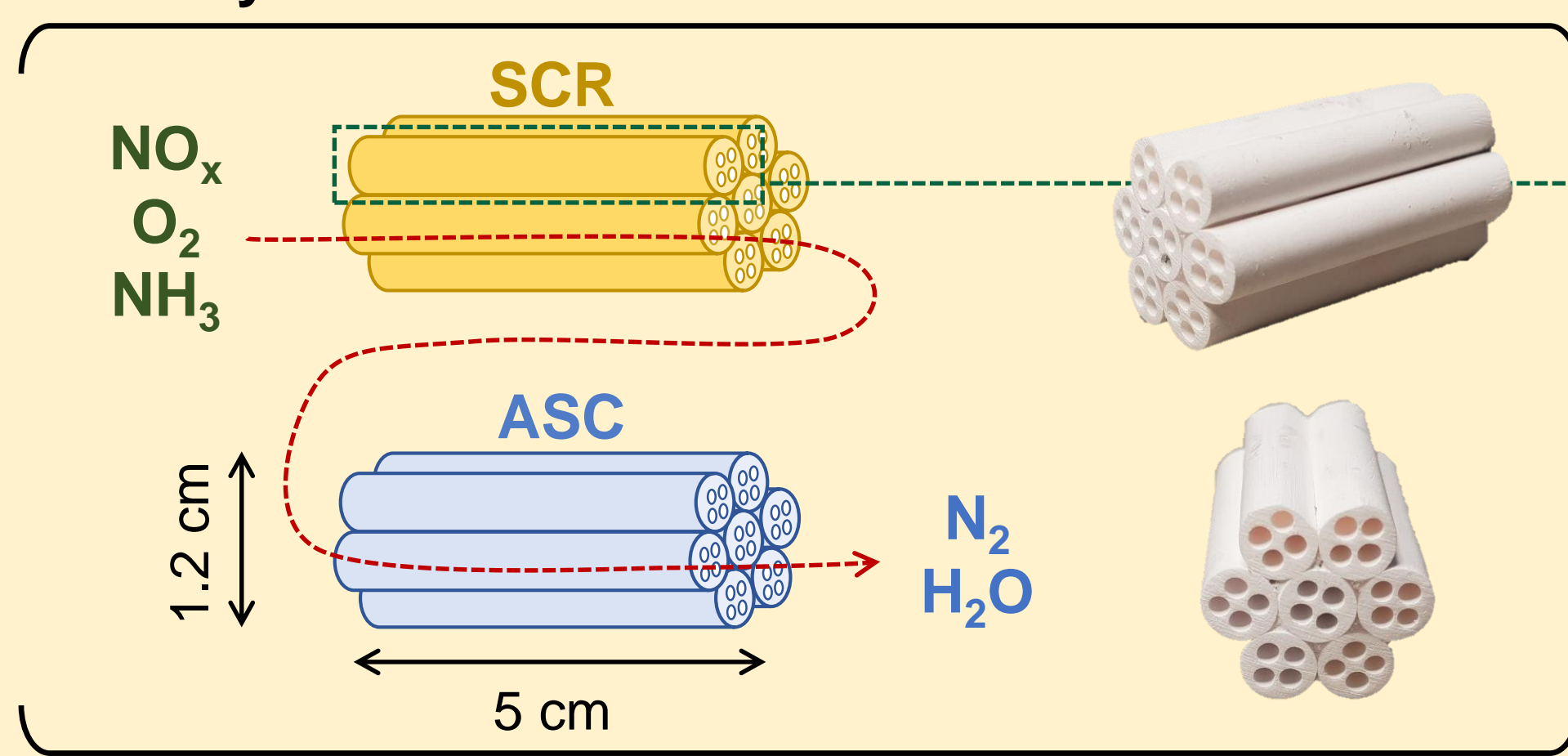
### Cross-section view



### Lateral view



### Catalytic Hollow Fibre-Based Converter



## The Solution

Compared to the traditional catalytic converter, catalytic hollow fibre-based converters have: i) a longer **lifetime**, ii) greater **design flexibility**, iii) enhanced **mass transfer** behaviour and iv) are **cheaper**.

Precious metals

Transition metals

1970

2022