

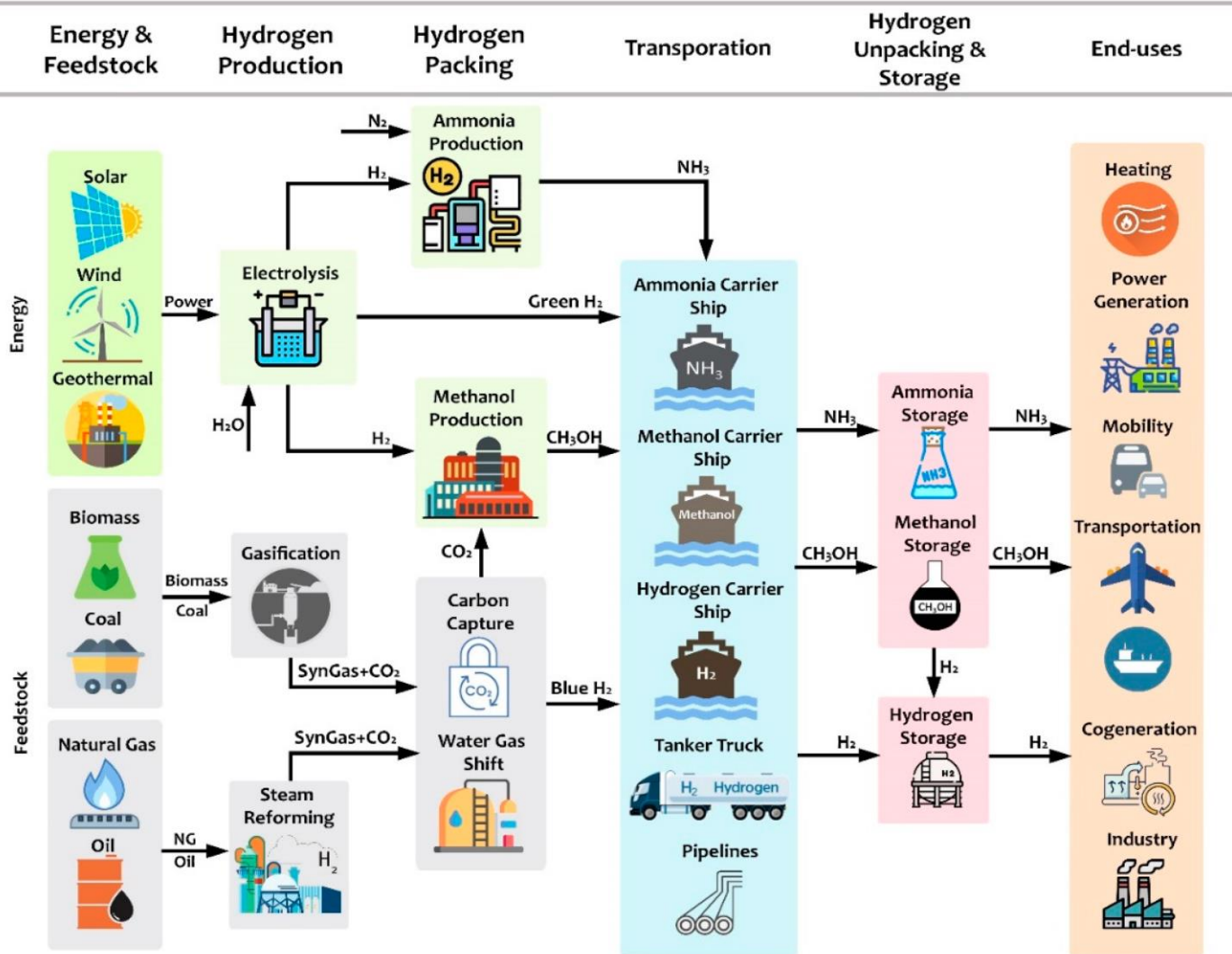


Efficient water splitting via a flexible solar-powered Hybrid thermochemical-Sulphur dioxide depolarized Electrolysis Cycle

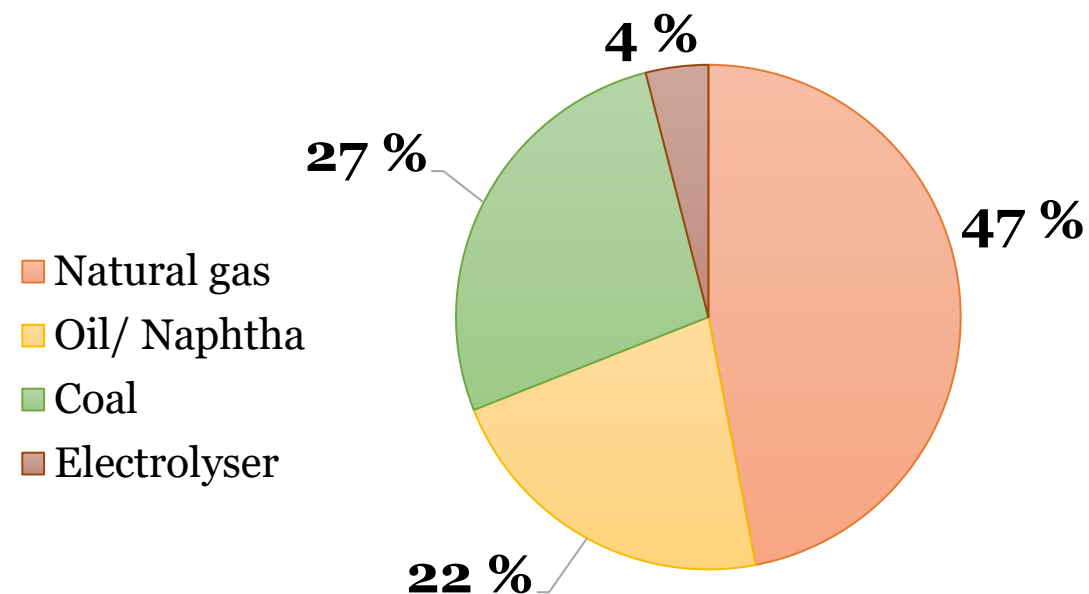
## Bibliometric analysis of SO<sub>2</sub> Depolarized Electrolyser

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Aalto University, Finland

# Need for a new electrolysis method?



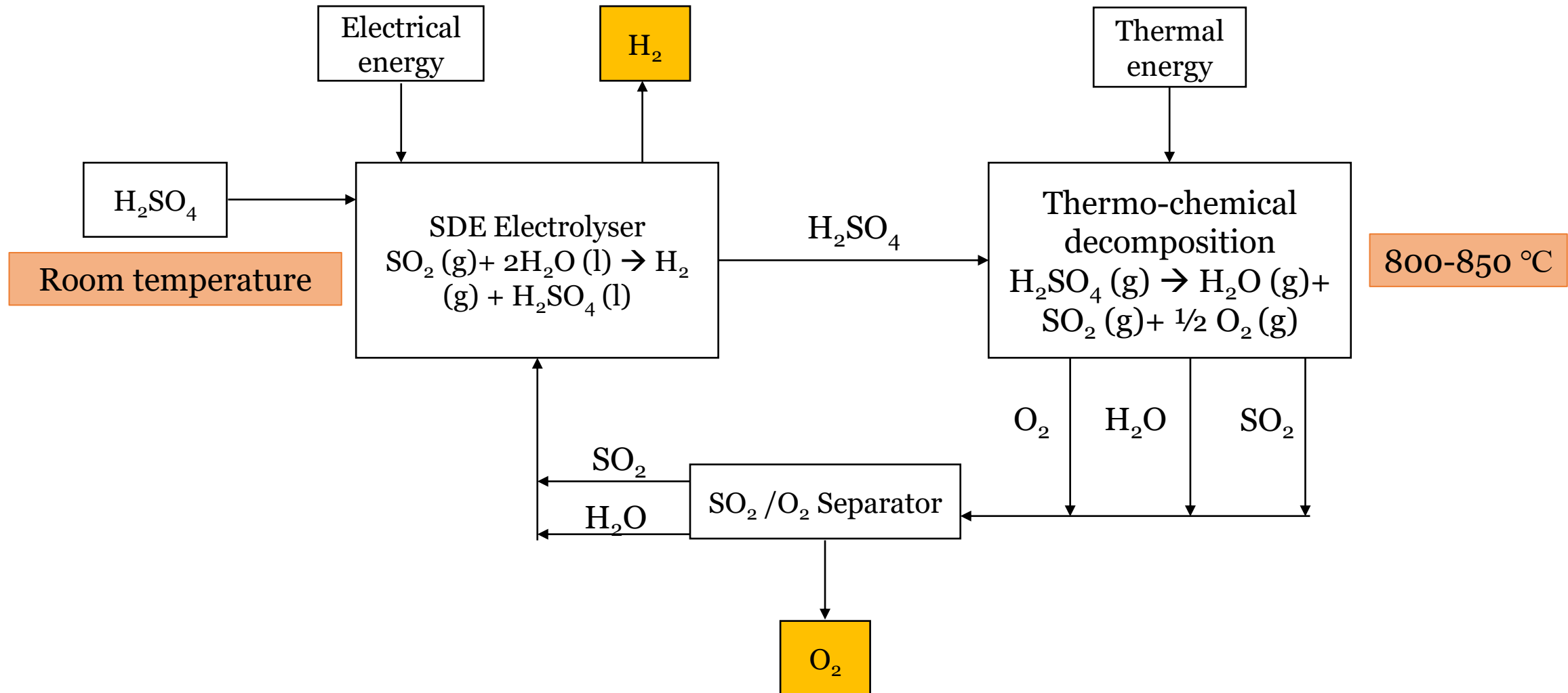
Share of hydrogen production methods



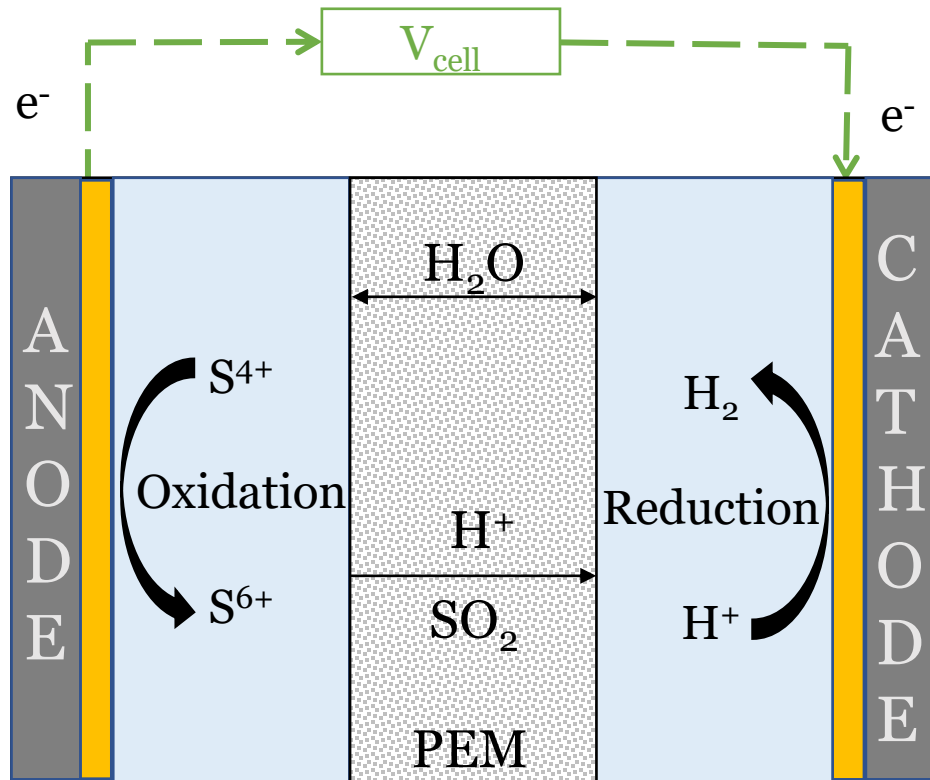
- Lower energy requirements
- Sustainable large scale hydrogen production
- The operating voltage range is 0.5 to 1.2 V which is much lower than that for PEM water electrolyser (1.6 to 2 V)
- The efficiency from electricity to H<sub>2</sub> is much higher than PEMEC
- SDE can be used in mining industry allowing onsite H<sub>2</sub> production using spent sulfuric acid and SO<sub>2</sub>.



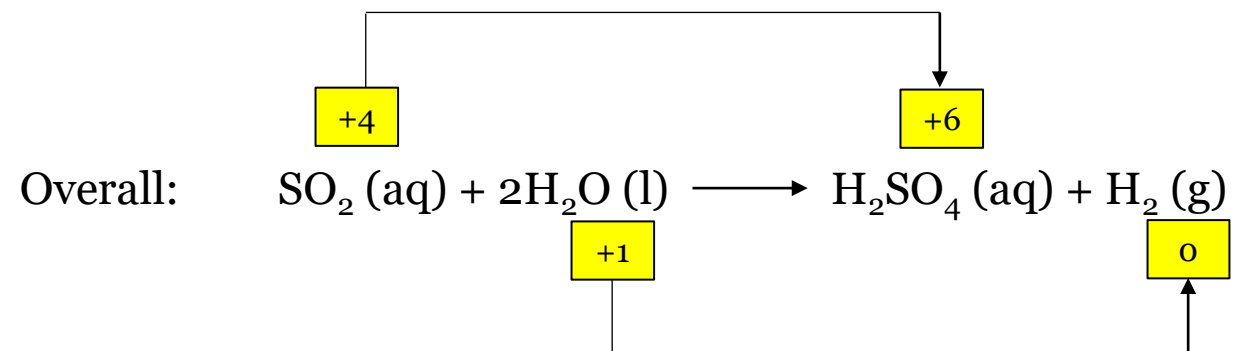
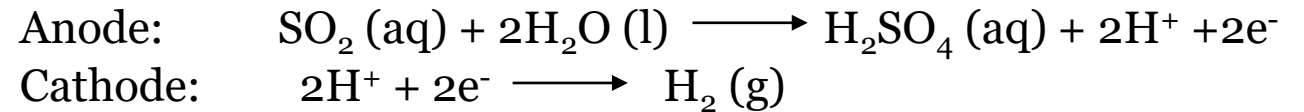
# Hybrid Sulphur Cycle (HyS)



# Working principle of SDE



- ✓ First presented by Juda and Moulton in 1967 for cheaper  $H_2$  production for use in basic chemicals
- ✓  $E^{\circ} = 0.158V$  (can only be realized between 0.5-1.2V) in comparison to water electrolyser with  $E^{\circ} = 1.23V$
- ✓ SDE would only require 25-60% of the electrical energy compared to the conventional electrolyser



# Bibliometric Analysis

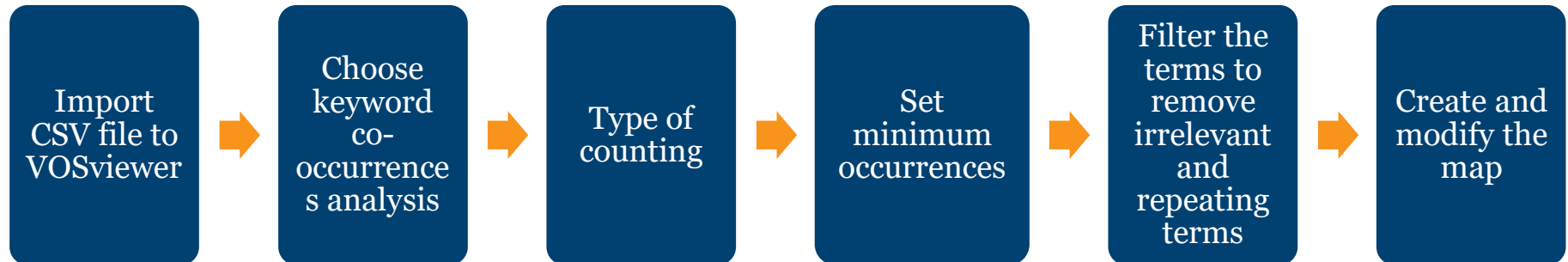
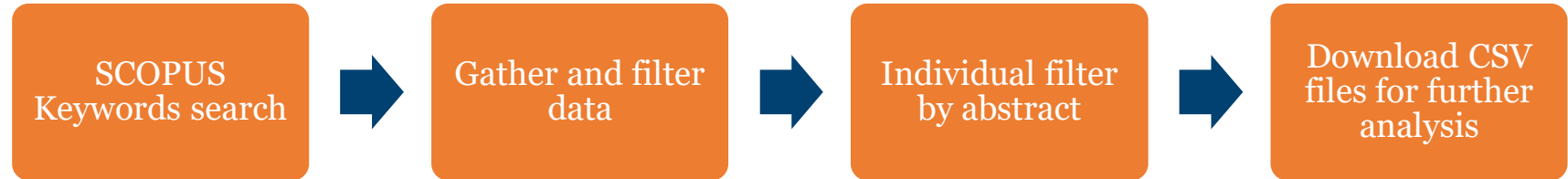
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- ✓ Helps improving the quality of future papers by allowing authors to consider the success from the past.
- ✓ Saves time for future authors by helping them identify relevant papers quickly.
- ✓ Reveals information in connection to the field's growth and impact, and the key contributors and publications within that field.

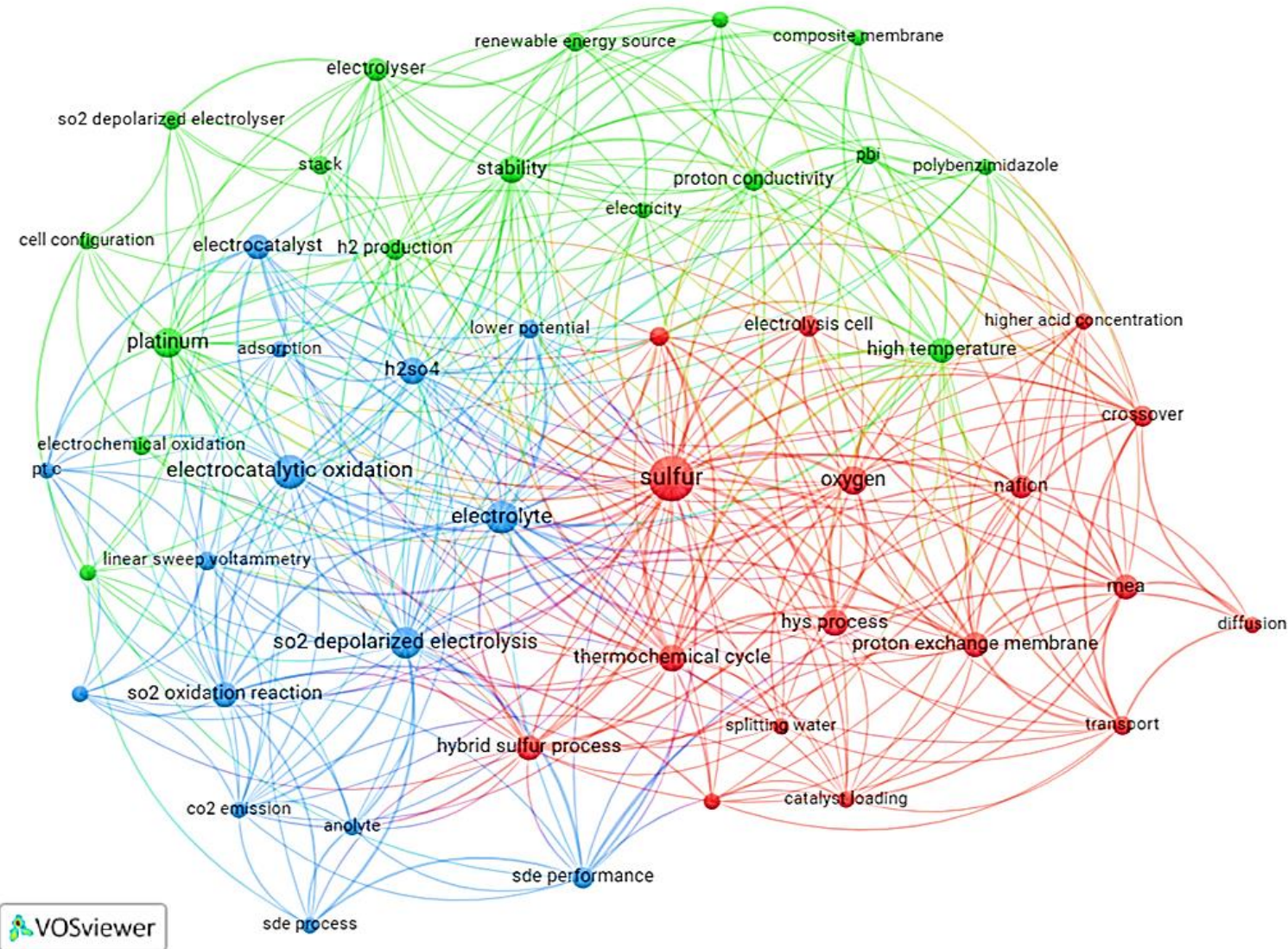
# Data gathering and analysis



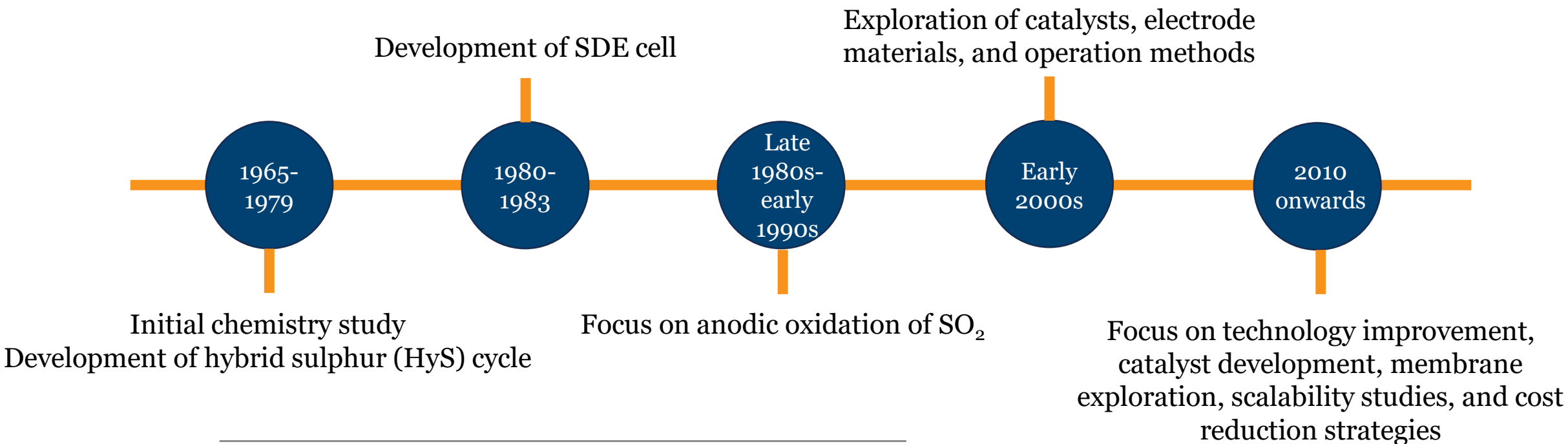


# Keyword Co-occurrences Analysis

- **Red cluster:** Initial years of development of the SDE
- **Blue cluster:** Basic concepts surrounding SDE
- **Green cluster:** Enhancing the SDE for higher H<sub>2</sub> production



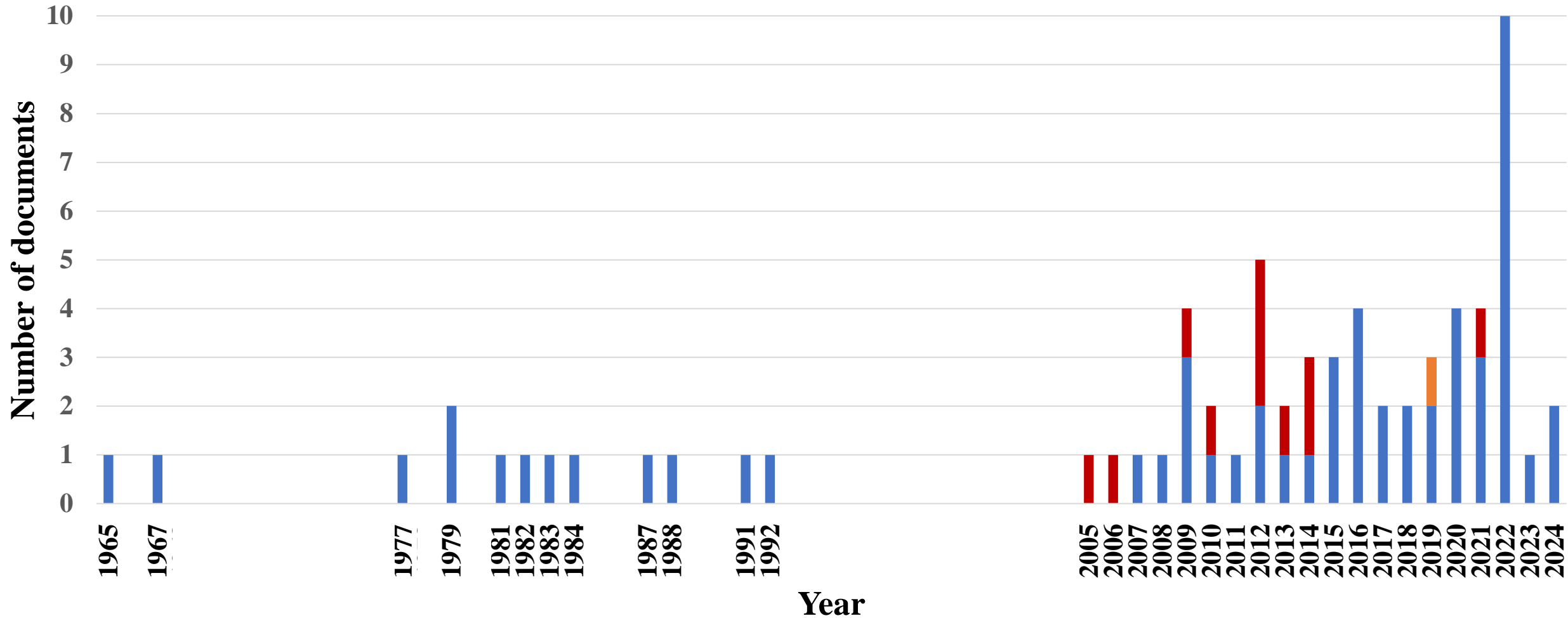
# Evolution of the field of SDE

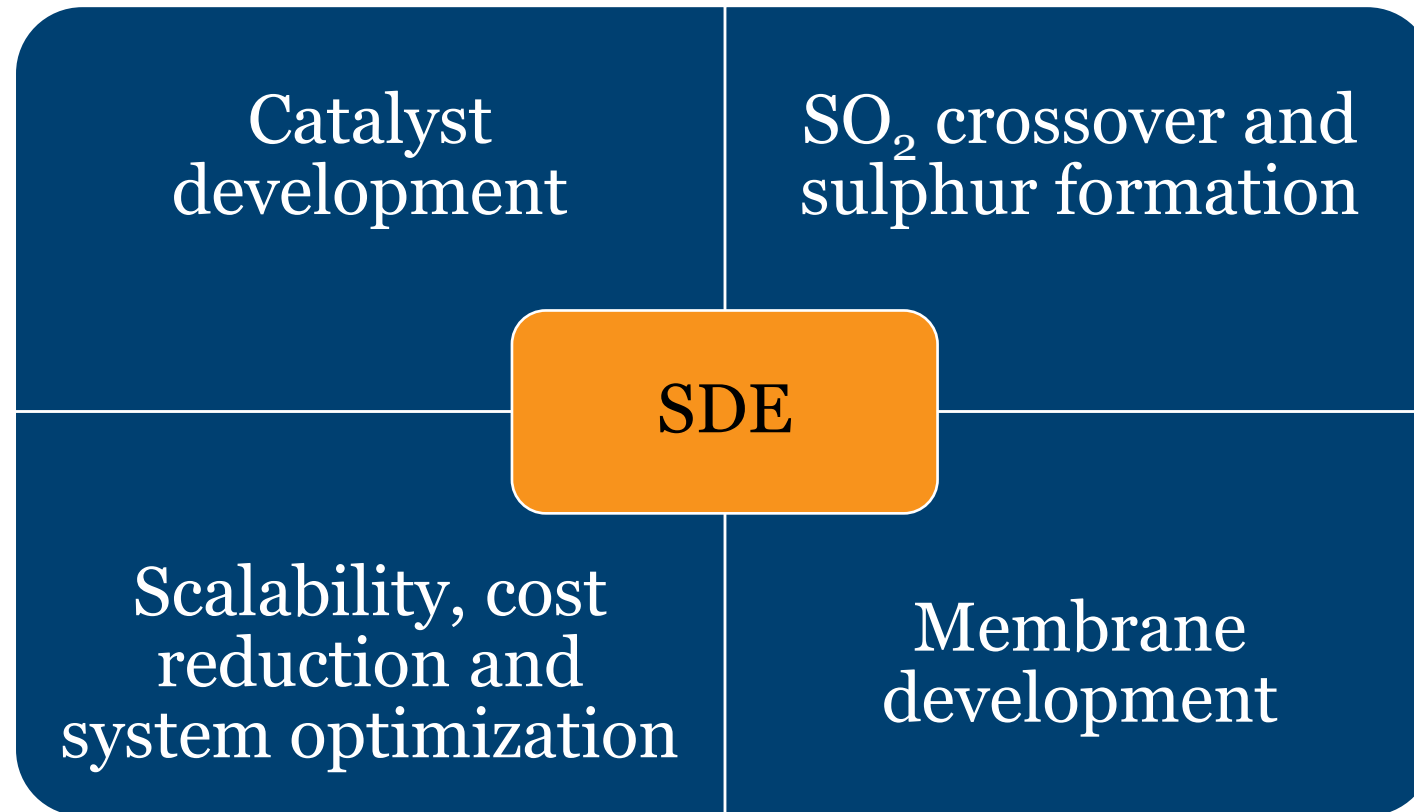


Sno.	Country	Number of documents	Citations	Average citations
1	USA	21	467	22.2
2	China	10	70	7
3	South Korea	9	43	4.8
4	Spain	6	42	7
5	Finland	5	54	10.8

# Evolution of the field of SDE

■ Article ■ Conference paper ■ Review



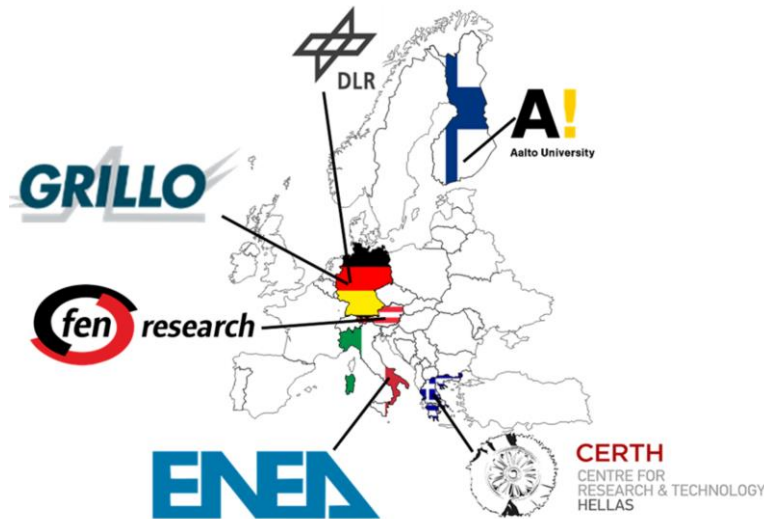


# HySelect<sup>+</sup>

Efficient water splitting via a flexible solar-powered Hybrid thermochemical-Sulphur dioxide depolarized Electrolysis Cycle



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