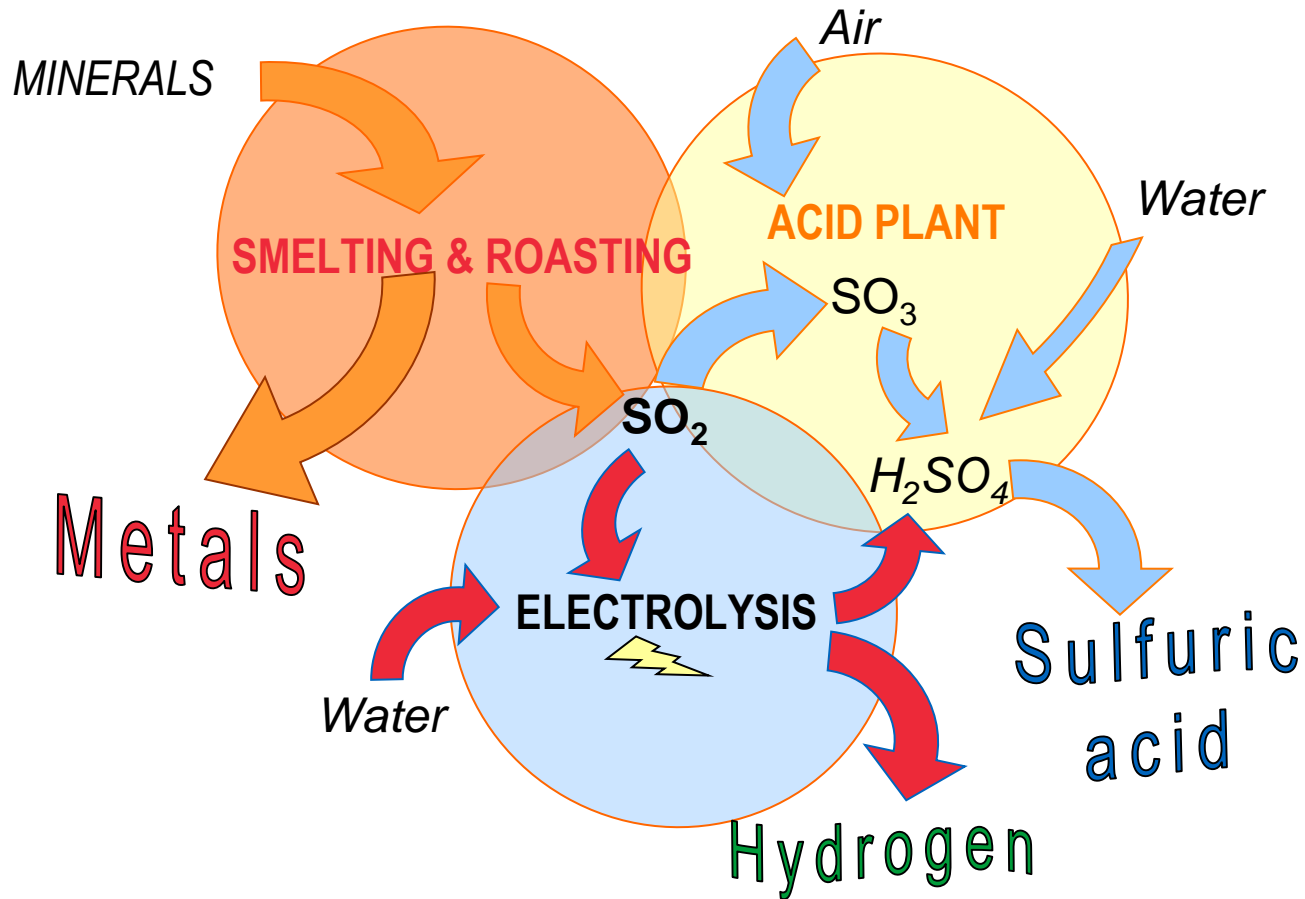


Impact of SO₂ crossover on H₂ production in SO₂-depolarized electrolyser

A. Santasalo-Aarnio,
M. Friman, M.M. Gasik

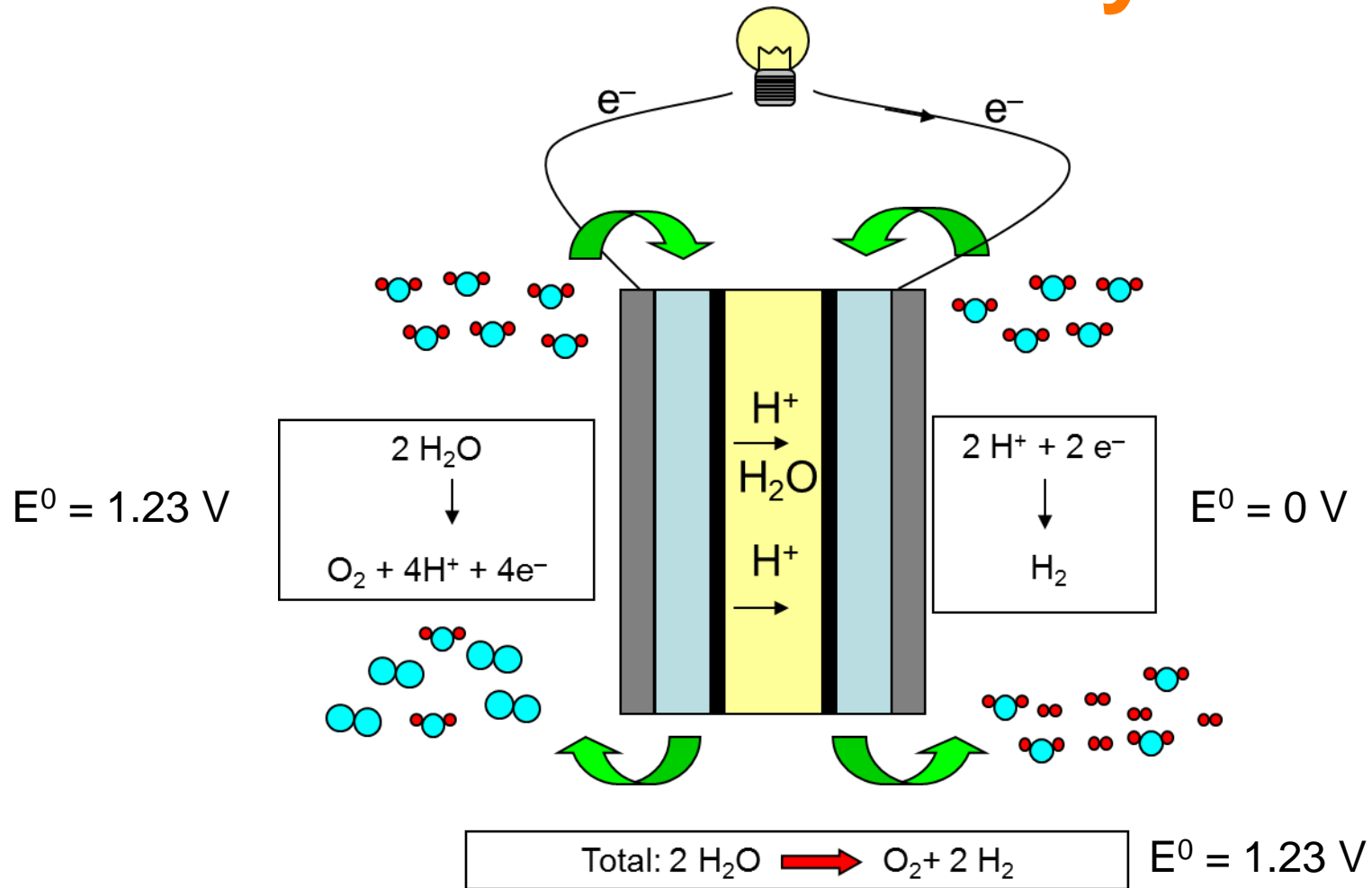
Department of Materials Science and Engineering,
School of Chemical Technology, Aalto University

H₂ co-production cycle

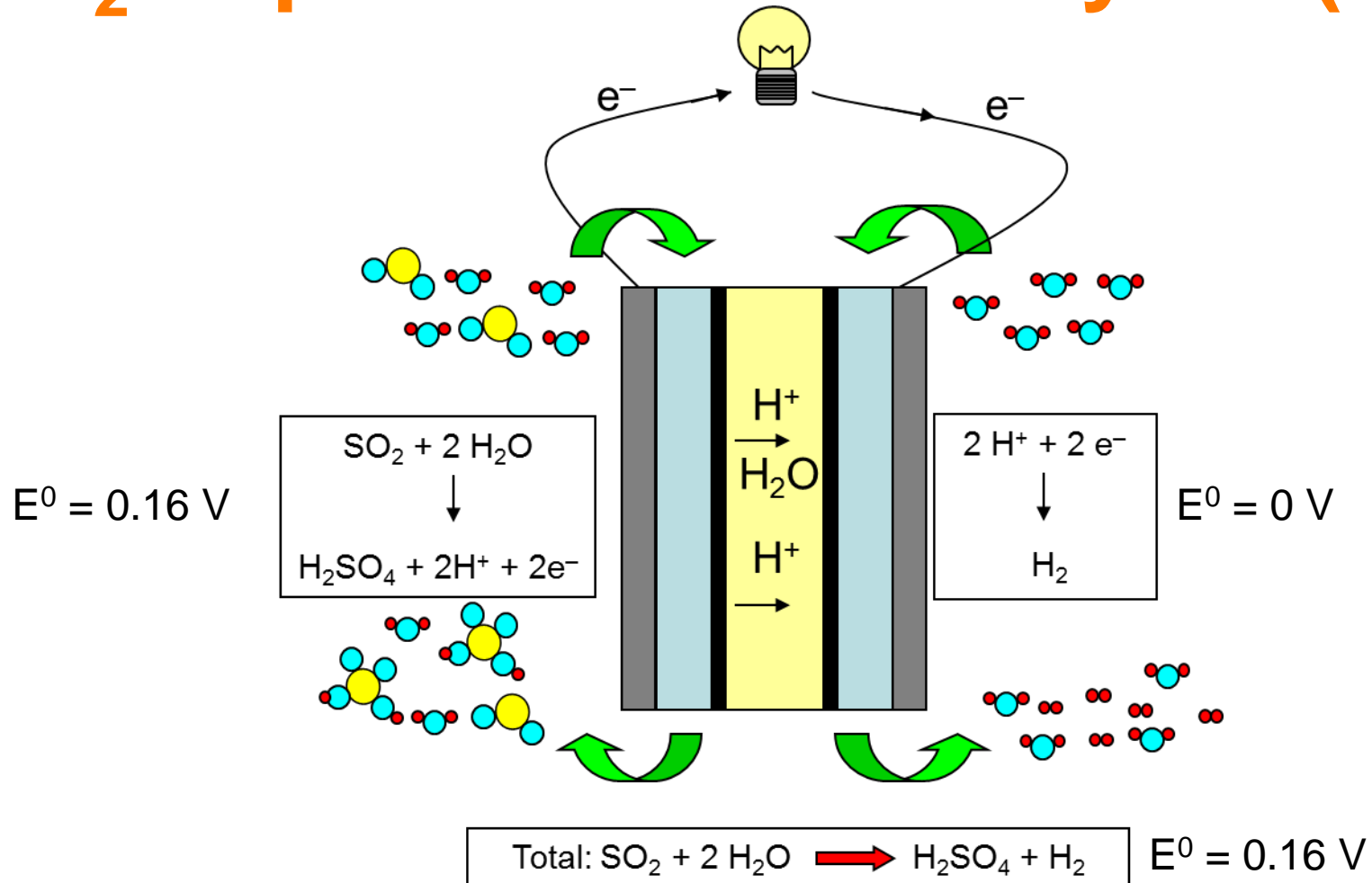


Outotec[®] Open Cycle

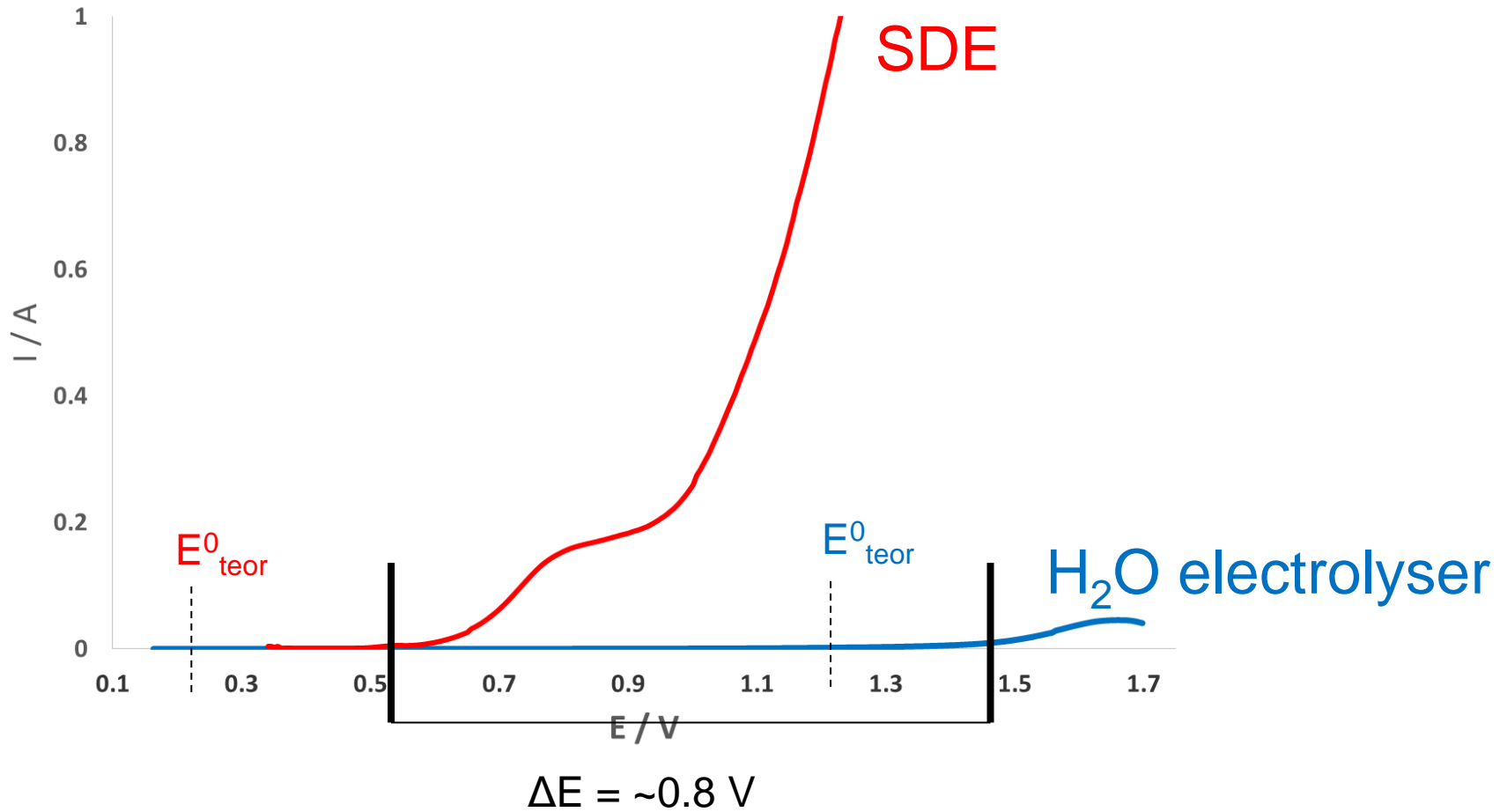
PEM Water electrolysis



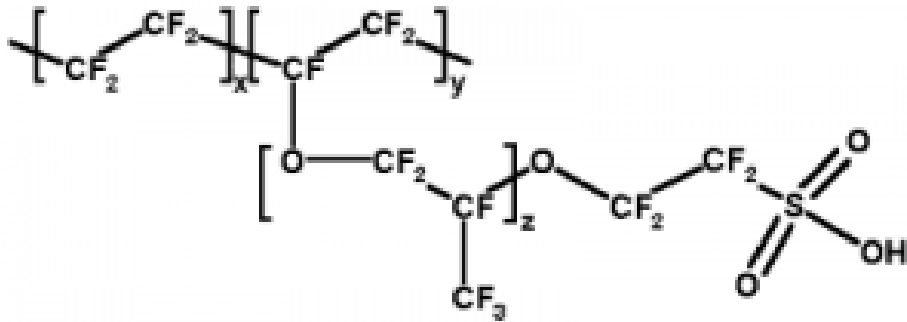
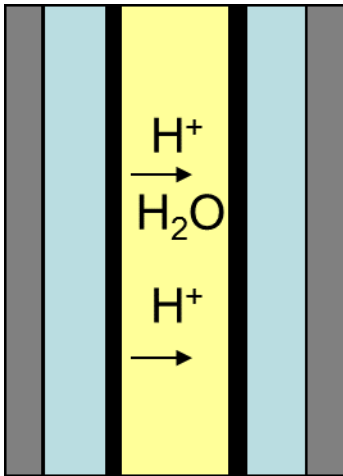
SO₂ depolarized electrolyser (SDE)



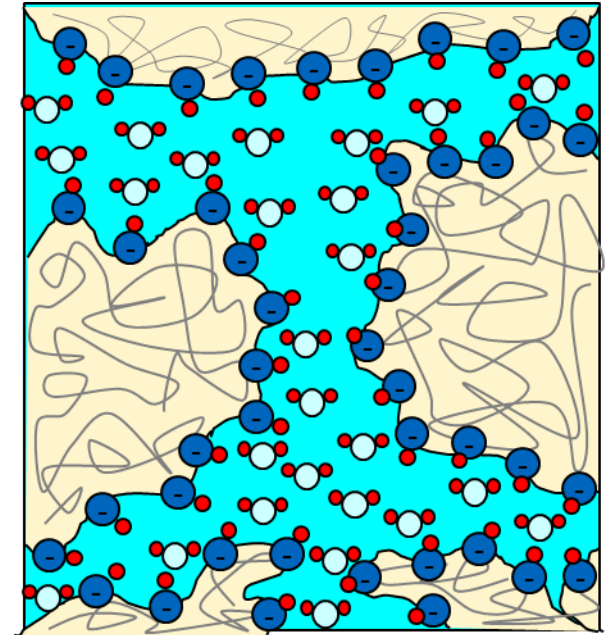
Water electrolyser vs. SDE



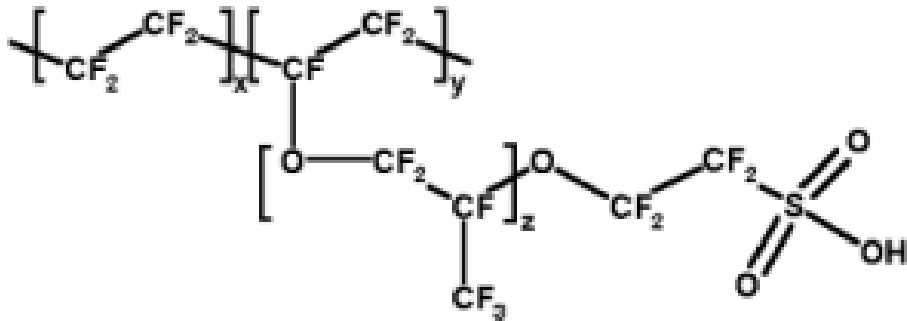
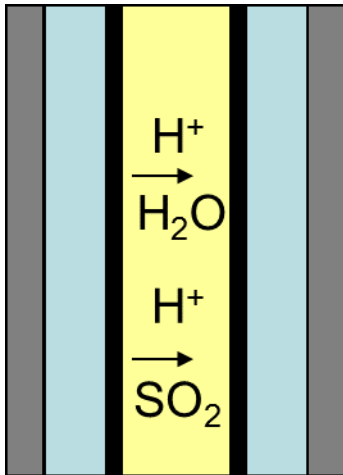
Water transport



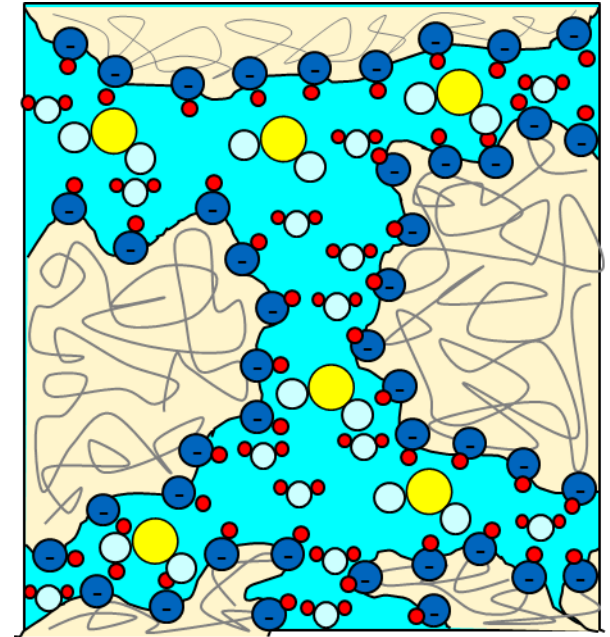
Nafion[®] structure



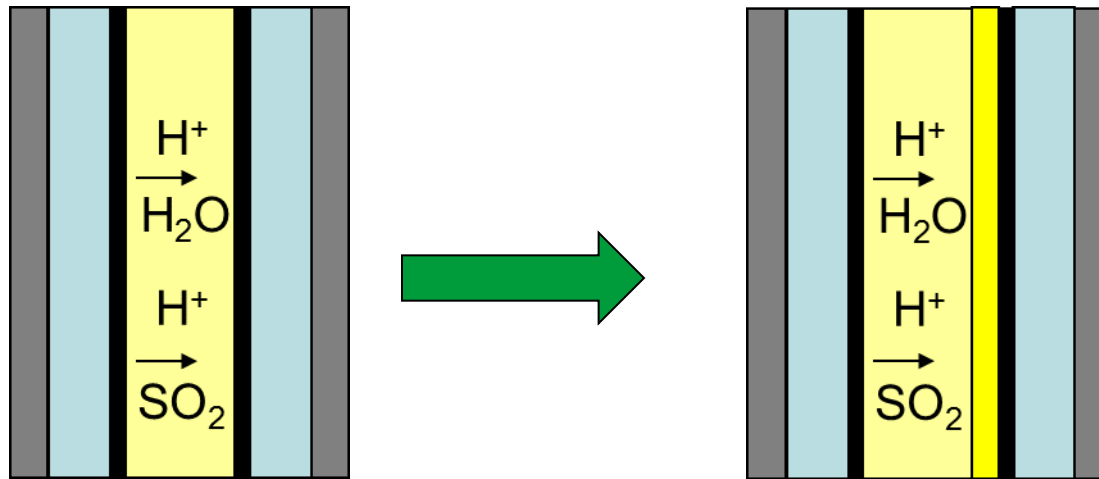
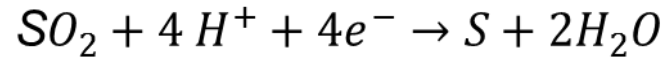
SO₂ transport



Nafion[®] structure



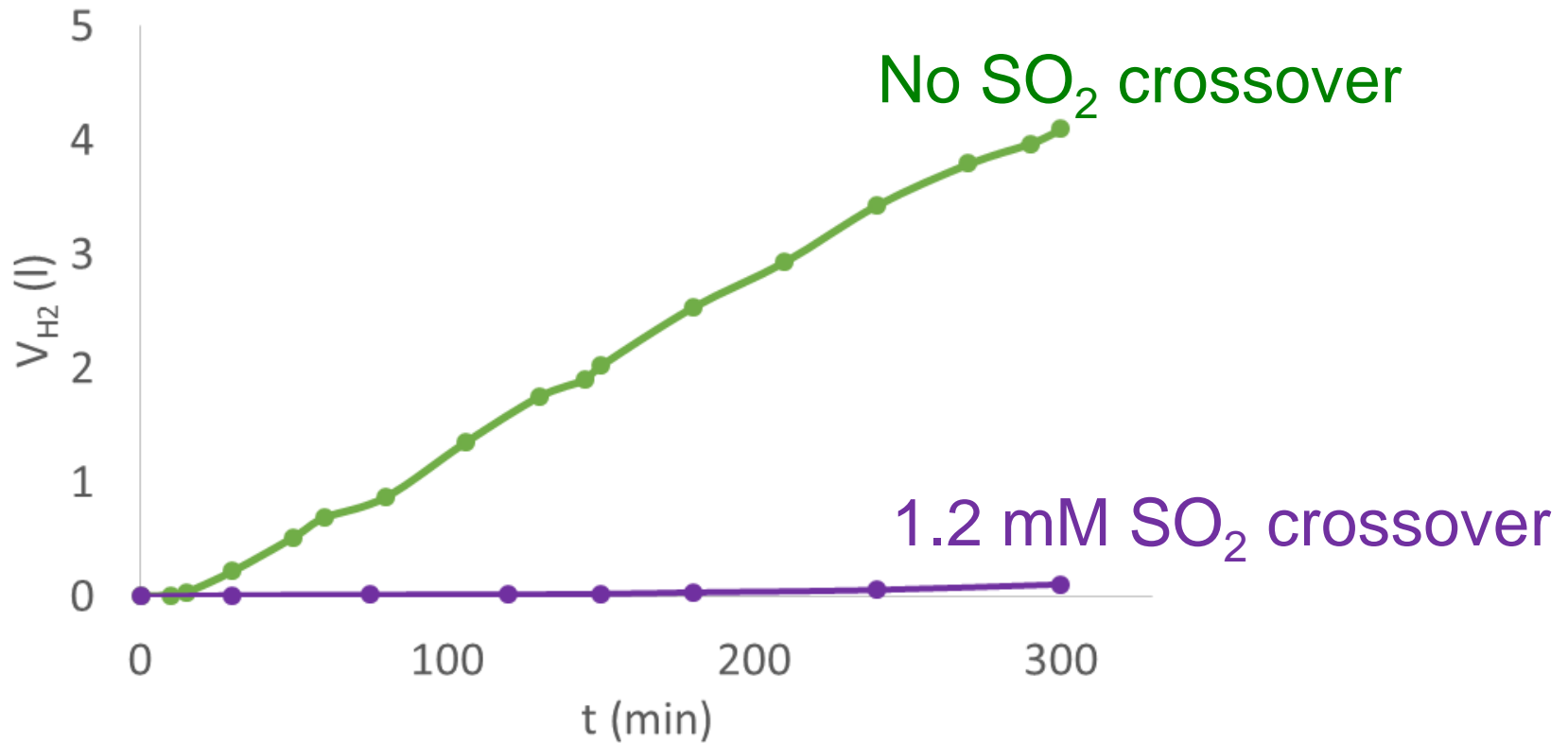
SO₂ crossover problem



Sulfur layer

M.C. Elvington *et al.*
J. Power Sources 195 (2010) 2823.

SO₂ crossover: impact on H₂ production

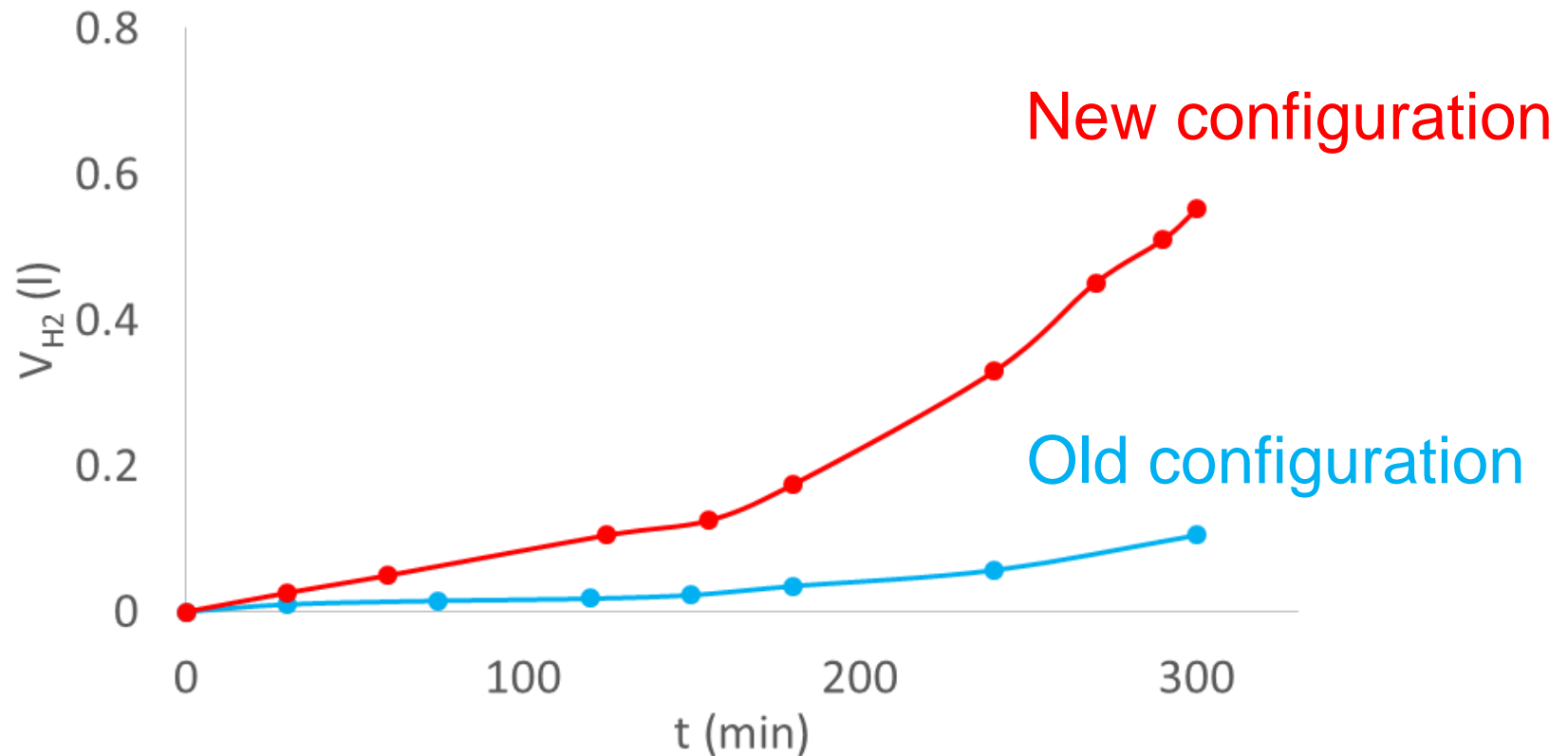


Electrolyser set-up



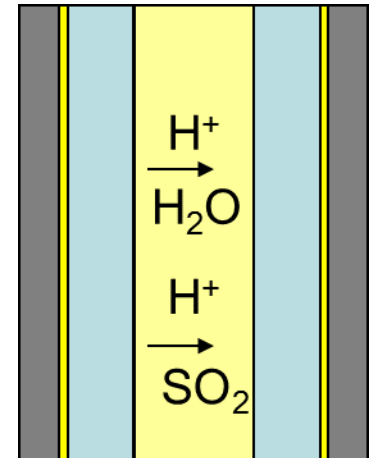
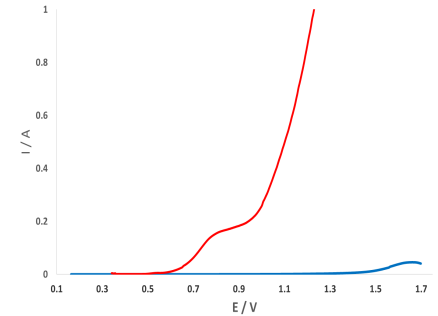
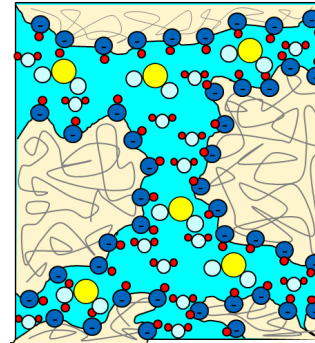
- Coated steel plates
- 1 bar pressure
- 22 l electrolyte circulation
- H₂SO₄-based electrolyte
- Nafion- membrane

SO₂ crossover improvement



Conclusions

- SDE has lower onset potential in comparison to water electrolysis
- SO₂ crossover is a challenge
- Changes in cell design improve the performance



Acknowledgements

