

Challenges in dissolving cellulose with the aim of cellulose regeneration and industrial applications

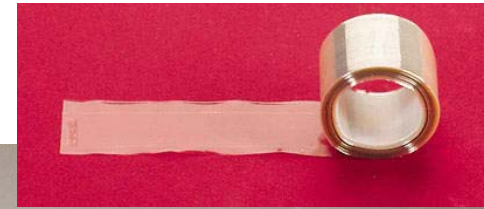
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30 September 2013



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Regenerated cellulose materials



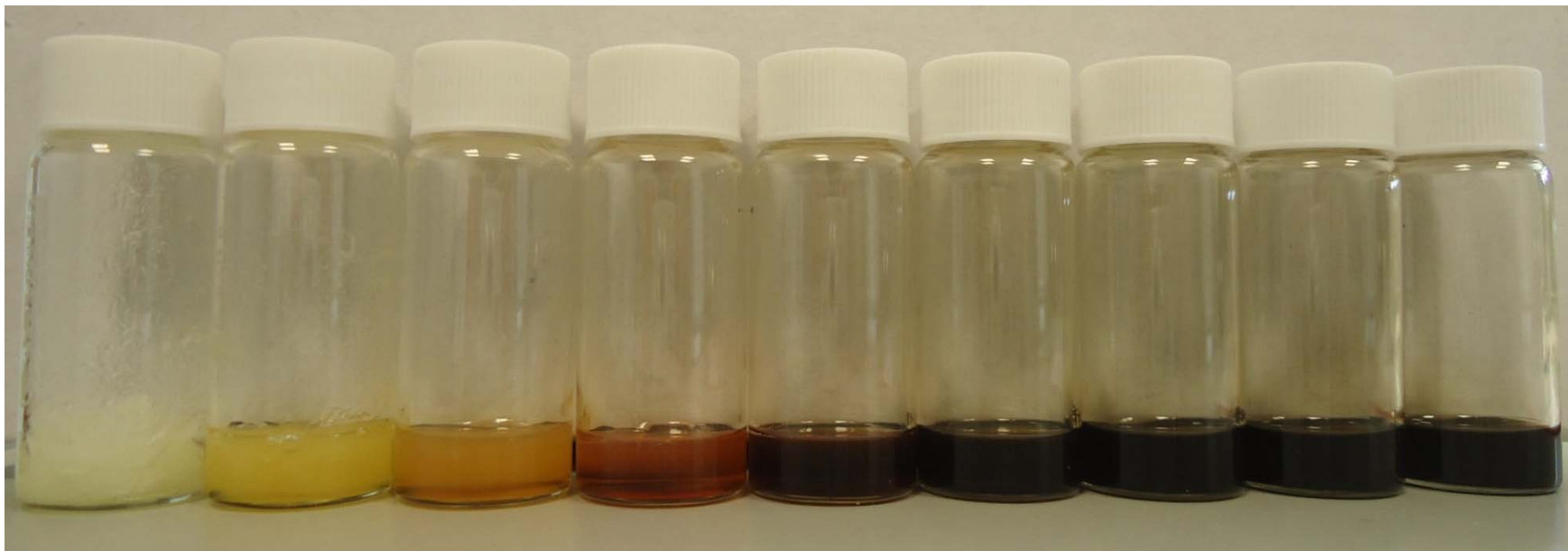
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Non derivatizing solvents for cellulose

- Ionic liquids
 - Effective but expensive
- Polar organic liquids
 - Solvent mixture, versatile
- Molten salts
 - Possibilities
- Bases / acids
 - Bulk chemical, straight forward mechanism
 - Problem with degradation / stability



Sulphuric acid + glycerol



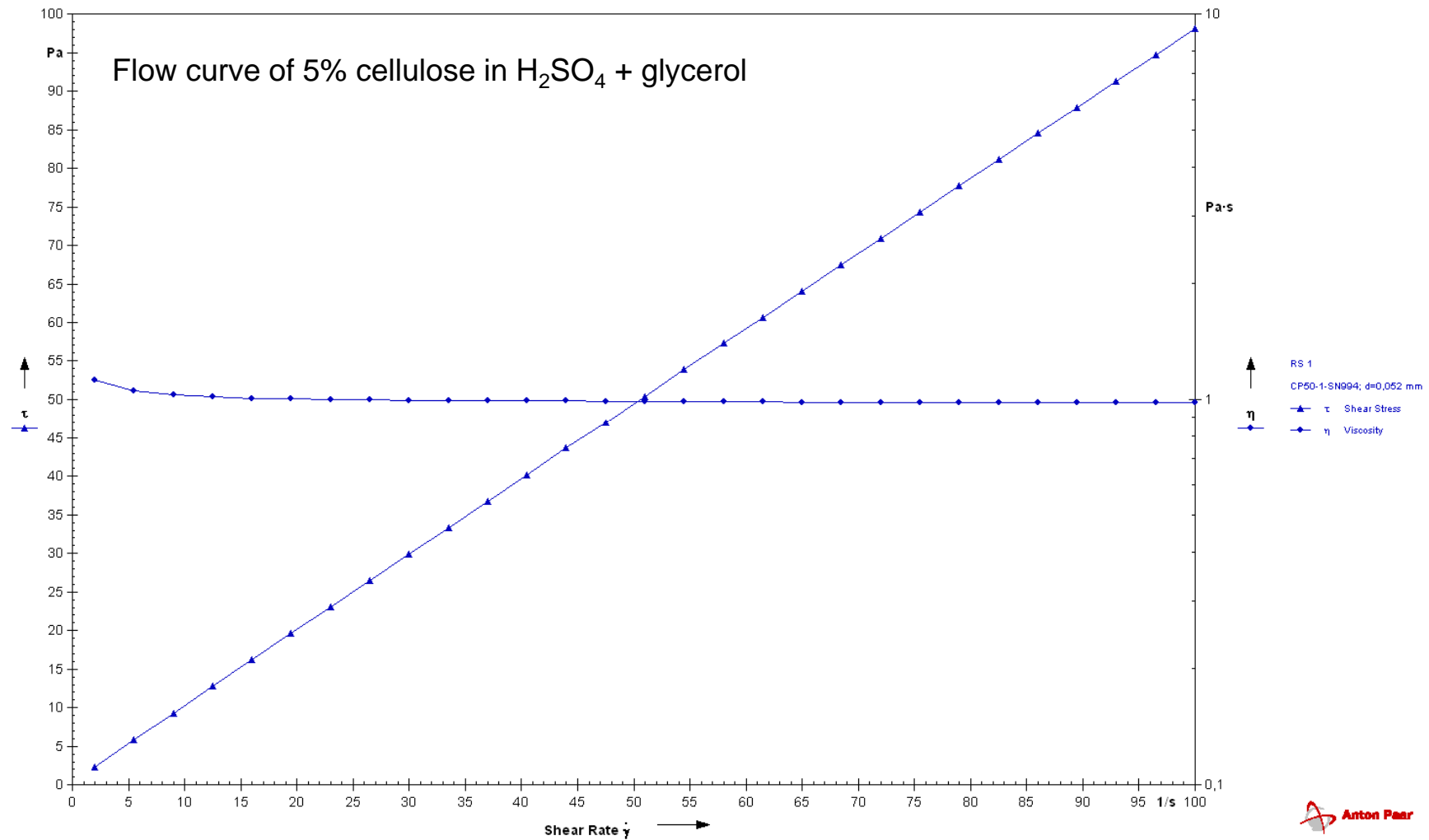
- Liebert, T. and et al. **“In Cellulose Solvents: For Analysis, Shaping and Chemical Modification”**. ACS Symposium Series. American Chemical Society: Washington DC. 2010.

Sulphuric acid + glycerol

- Specific conditions to dissolve cellulose
 - Appx. 65% sulphuric acid + 25% glycerol
 - Length: <30 mins
 - Temperature profile: 30-50°C
- Flow curve
 - Cellulose dissolved extensively
 - Molecular solution



Sulphuric acid + glycerol



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Sulphuric acid + glycerol

- Fiber regeneration
 - 7% and 20% NaOH as the coagulation medium
 - Non retainable cellulose film
 - Possible explanation
 - Solvents are too aggressive
 - Glycerol is not sufficient enough to inhibit degradation of cellulose
 - Glycerol might not be inert → glycerolyses.
- Application
 - Any application which demands on an extensively dissolved cellulose system
 - Eg. preparation of NCC



Thank you for your inputs



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