

# Vorticity and velocity banding in shear thickening solutions of wormlike micelles

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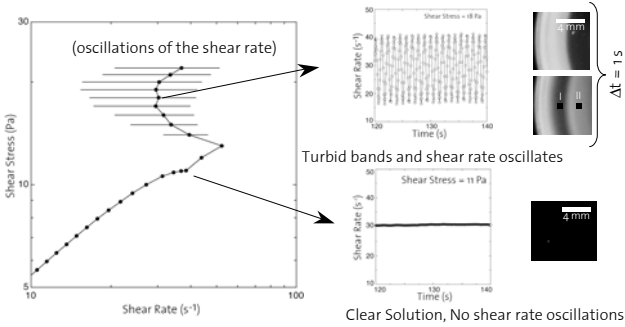
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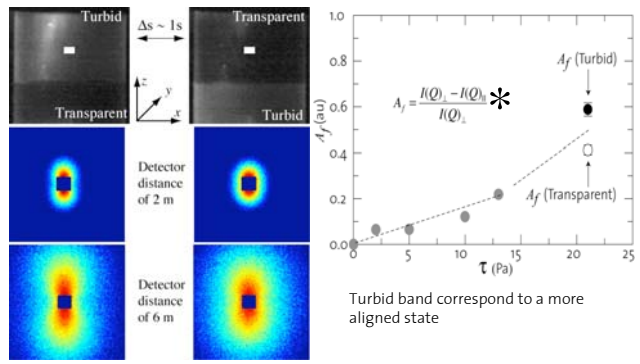
## Optical Rheometry: Flow and Structure [1-4]

### Stress Controlled Flow - Shear Rate Oscillations

Shear thickening behavior with the formation of shear bands

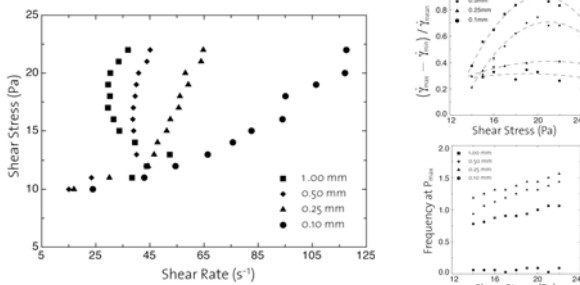


## Triggered SANS: Structure and Alignment [5]

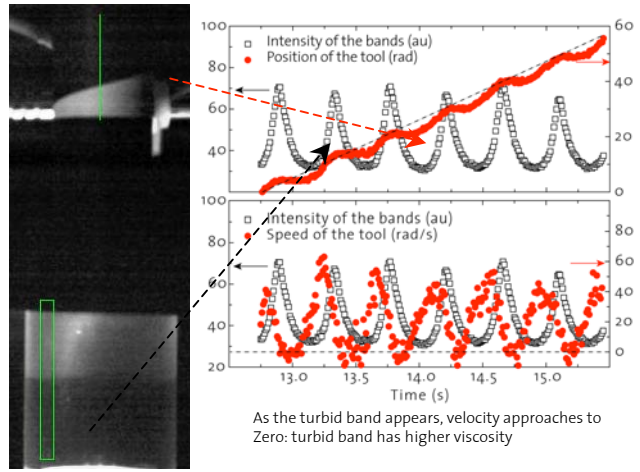


### Effect of Gap Size

Lowering the gap leads to more number of less intense turbid bands and dampening of the shear rate oscillations.

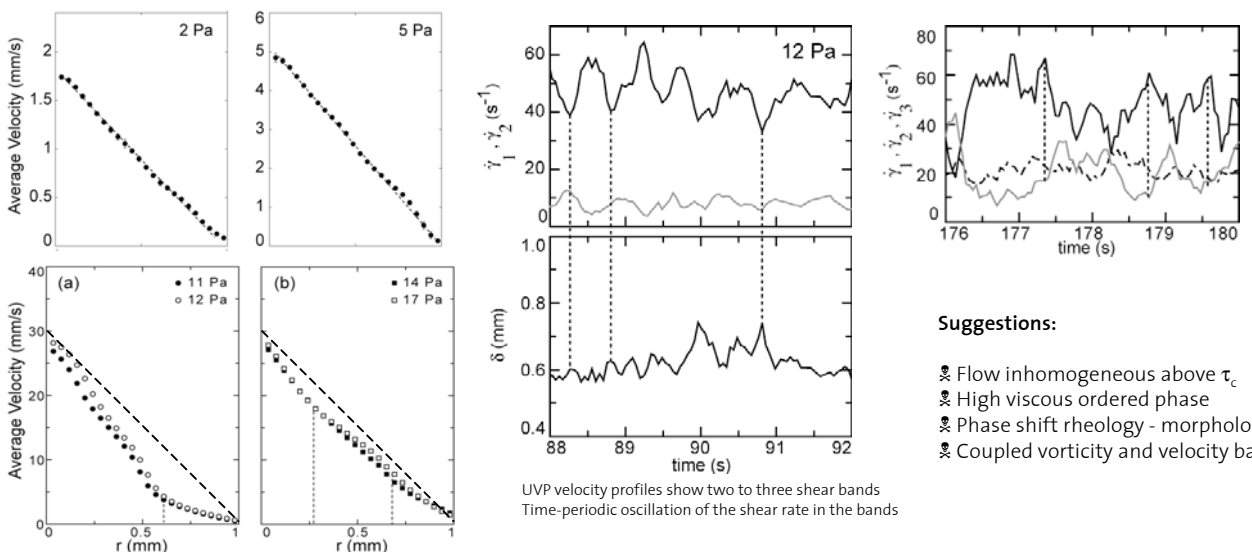


Decrease in the gap suppresses the rate oscillations  
Fast structural changes in the lower gaps  
At 0.1 mm totally different kind of structure or no structure



As the turbid band appears, velocity approaches to Zero: turbid band has higher viscosity

## Ultrasonic velocity profiling: Viscosity of the individual bands [6]



### Suggestions:

- Flow inhomogeneous above  $\tau_c$
- High viscous ordered phase
- Phase shift rheology - morphology
- Coupled vorticity and velocity bands

UVP velocity profiles show two to three shear bands  
Time-periodic oscillation of the shear rate in the bands