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The Development, Formulation and Stability of Suds and Antifoam for Heavy Duty Liquid Laundry Detergents

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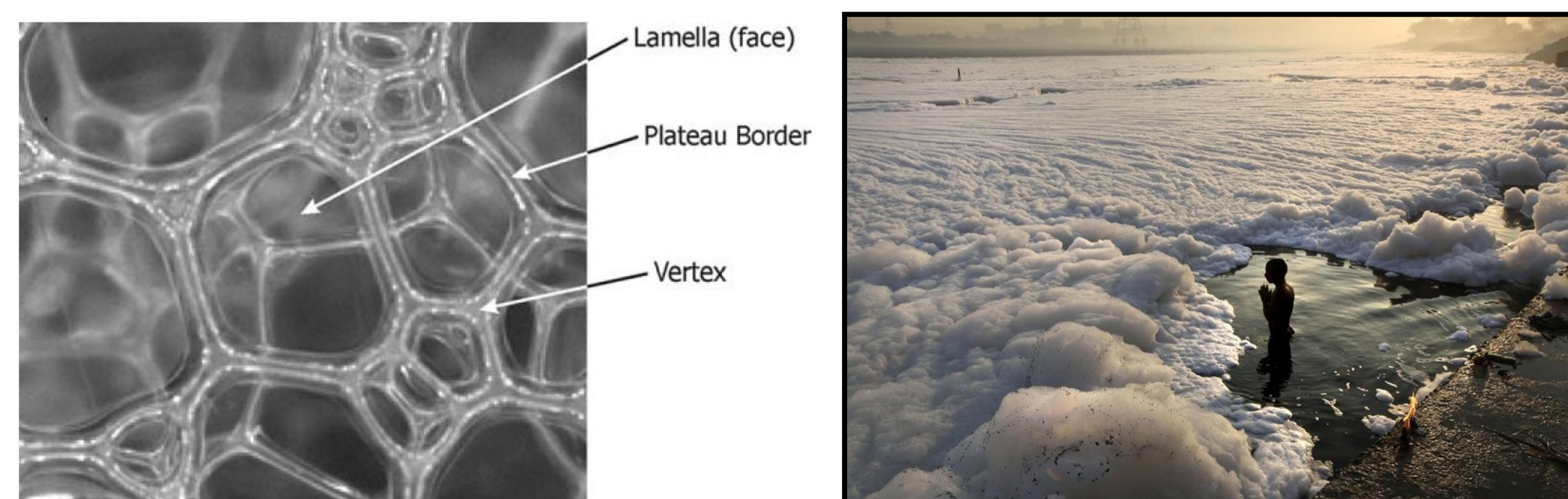
The Development, Formulation and Stability of Suds and Antifoam for Heavy-Duty Liquid Laundry Detergents

Abstract

While suds is one indication of chemicals at work in laundry detergent, it can interfere with cleaning performance in the washing machine. The background of foam, surfactants, consumer perception, antifoam, surface tension and silicone will be discussed followed by various properties and chemical compounds that are best for suds suppression.

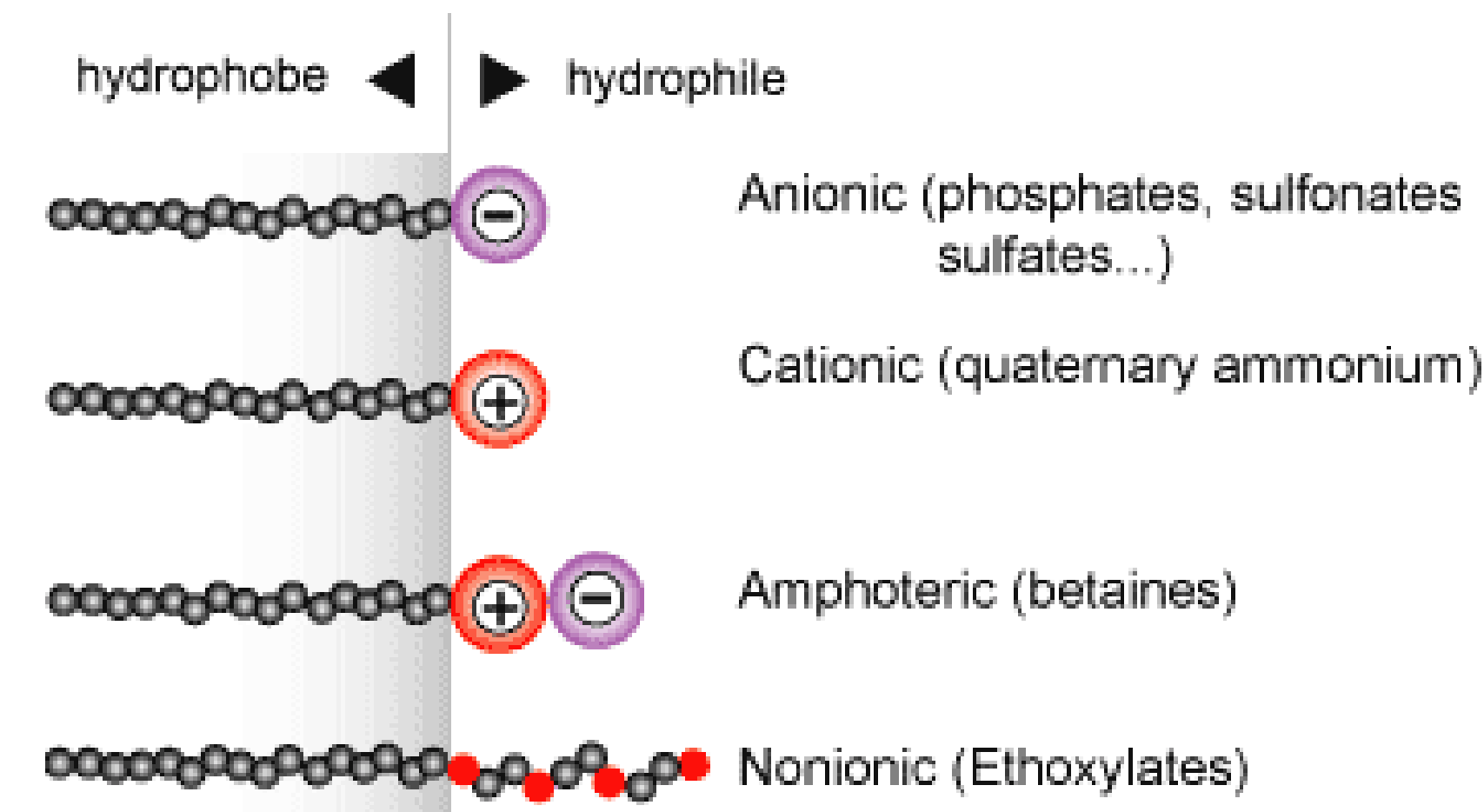
Background - Bubbles

- ✓ Size distribution
- ✓ Gravity drainage
- ✓ Thinning of liquid lamellae
- ✓ Bubble coalescence



Surfactants

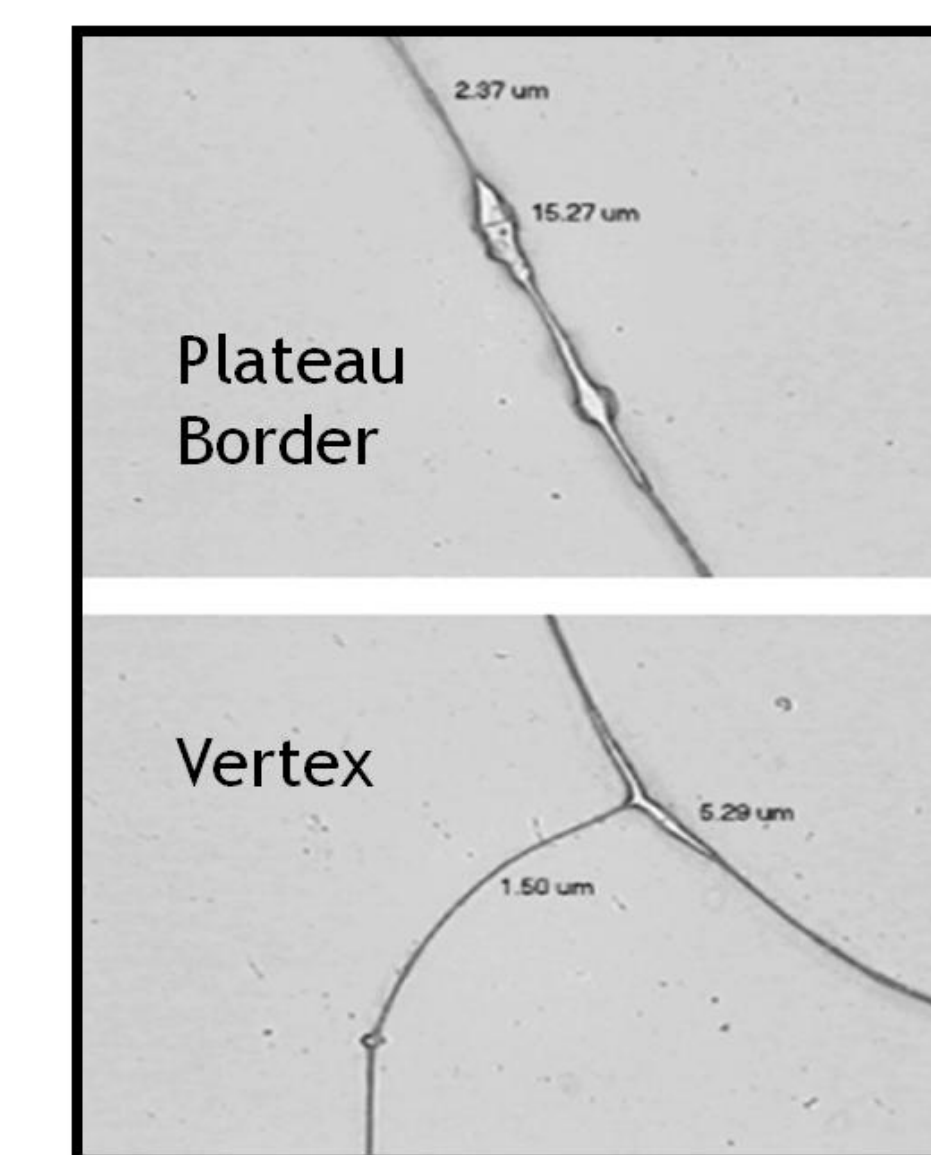
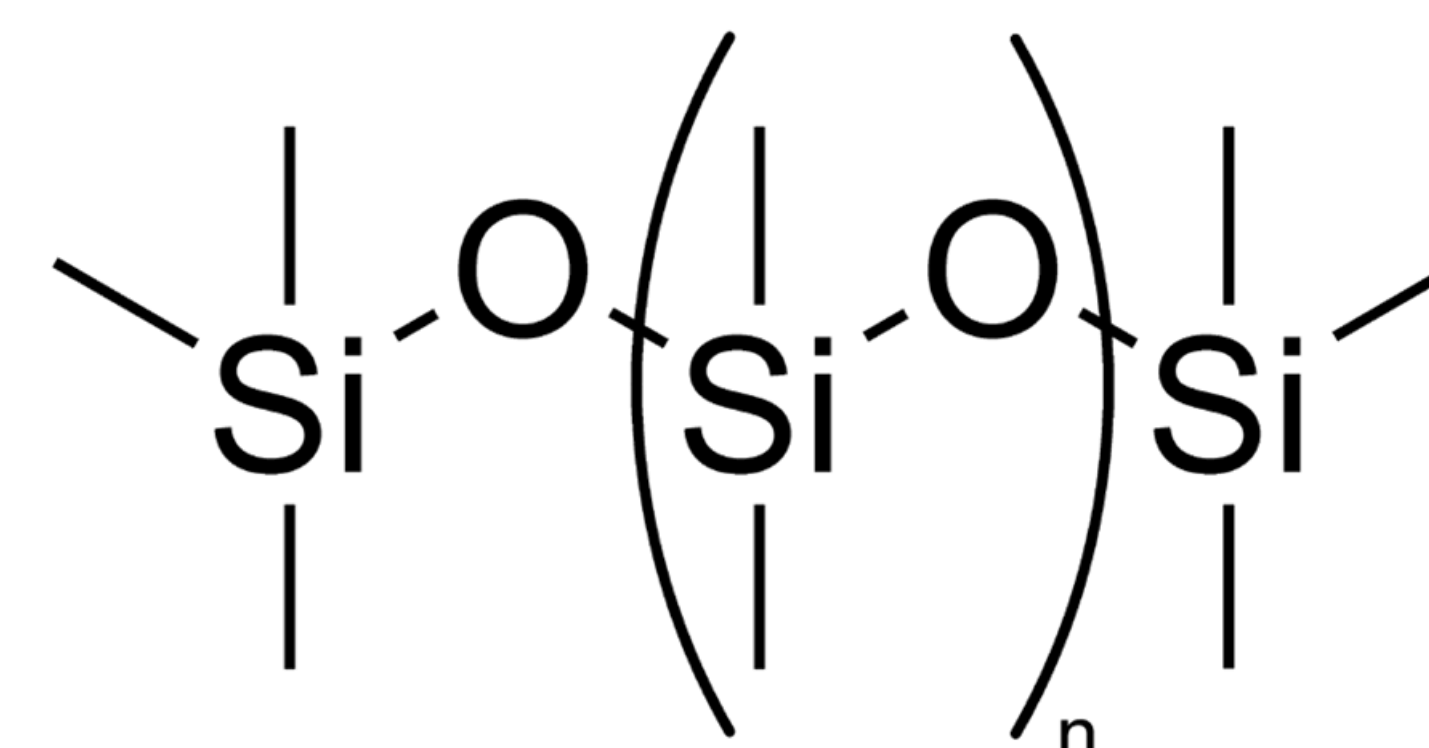
- ✓ Moves toward "surfaces"
- ✓ Helps dissolve what's not soluble
- ✓ Lowers surface tension



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Antifoams

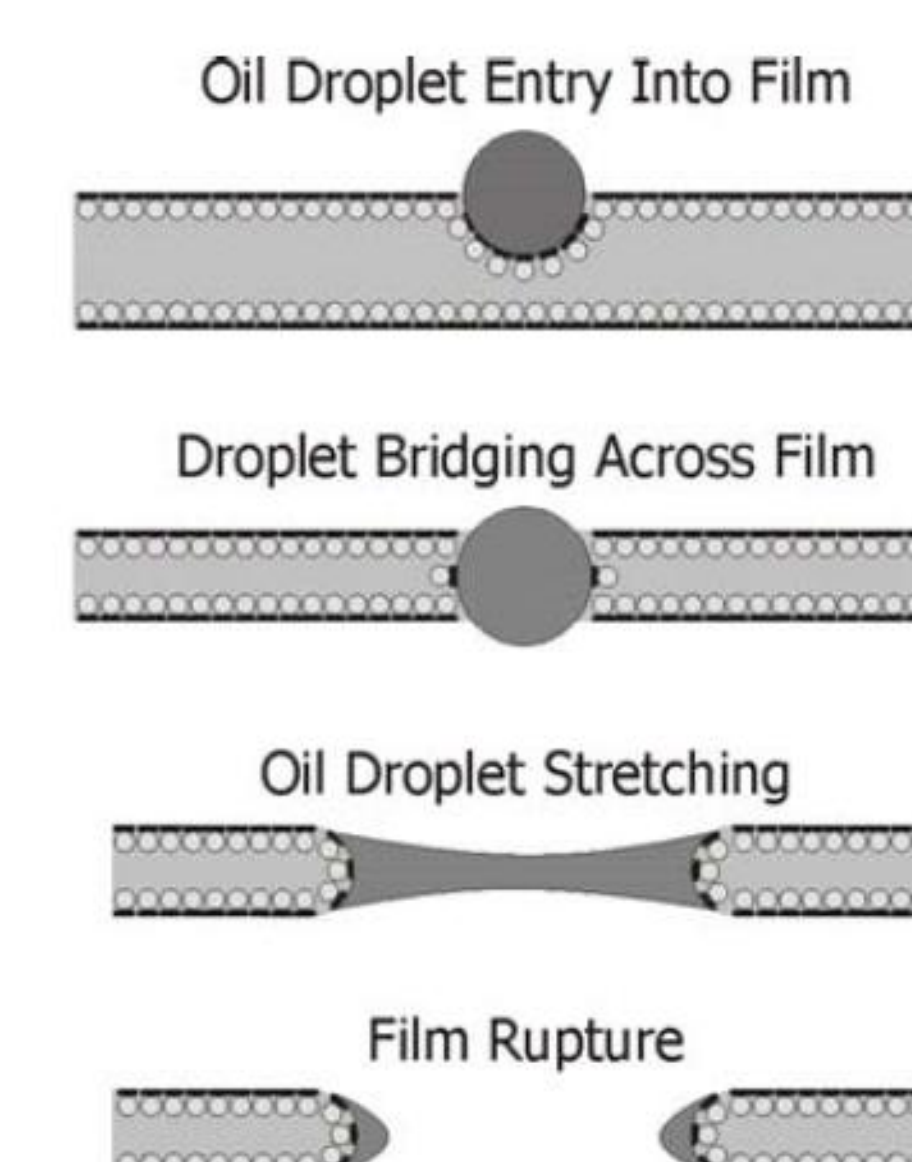
- ✓ Defoamer – breaks existing foam
- ✓ Antifoam – prevents foam
 - ✓ Non-polar oils
 - ✓ Polar oils
 - ✓ Hydrophobic solids
- ✓ Slow and fast
- ✓ Hydrophobic silica
- ✓ Silicone oil (PDMS)



Slow antifoams

Antifoam Mechanisms

- ✓ Hydrophobic solids (silica) reduce energy needed to penetrate the entry barrier
- ✓ Liquid drainage thins lamella = strain
- ✓ Oil stretches with film



Consumer Perception

- ✓ Visible suds = doing its job
- ✓ Too many suds = more resources used, costs more money



Conclusions

- ✓ Antifoams are underestimated
- ✓ Enhances consumer perception
- ✓ Silicone-based are so far the best
- ✓ Next Steps
 - ✓ Sustainable detergents
 - ✓ Cost-reducing materials
 - ✓ Synthesize for lower viscosity with high viscosity properties
 - ✓ Reduce antifoam aggregation

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