SLIDING CAVITY ACCOMMODATIONS FOR LIQUID-LIQUID AND THIN-FILM EXPERIMENTS IN LOW GRAVITY

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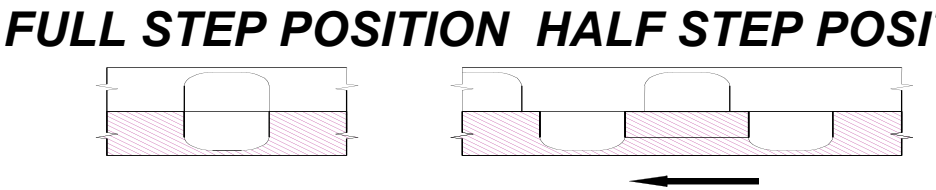
Scientific Questions at Liquid-Liquid Interfaces

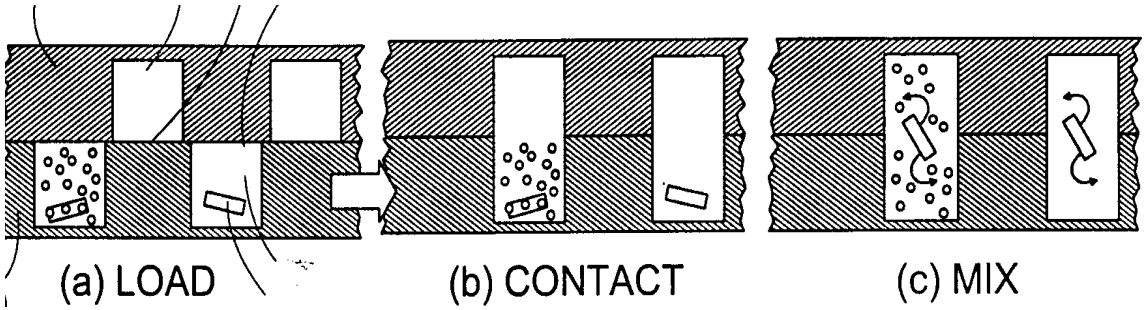
- Transport phenomena
- Diffusion (mixing cup)
- Interfacial tension driven flows
- Phase demixing
- Thin-film formation
- Electrokinetic transport
- Magnetic transport
- Reaction kinetics
- Your experiment here

How It Works

Temporary or permanent static fluid contact



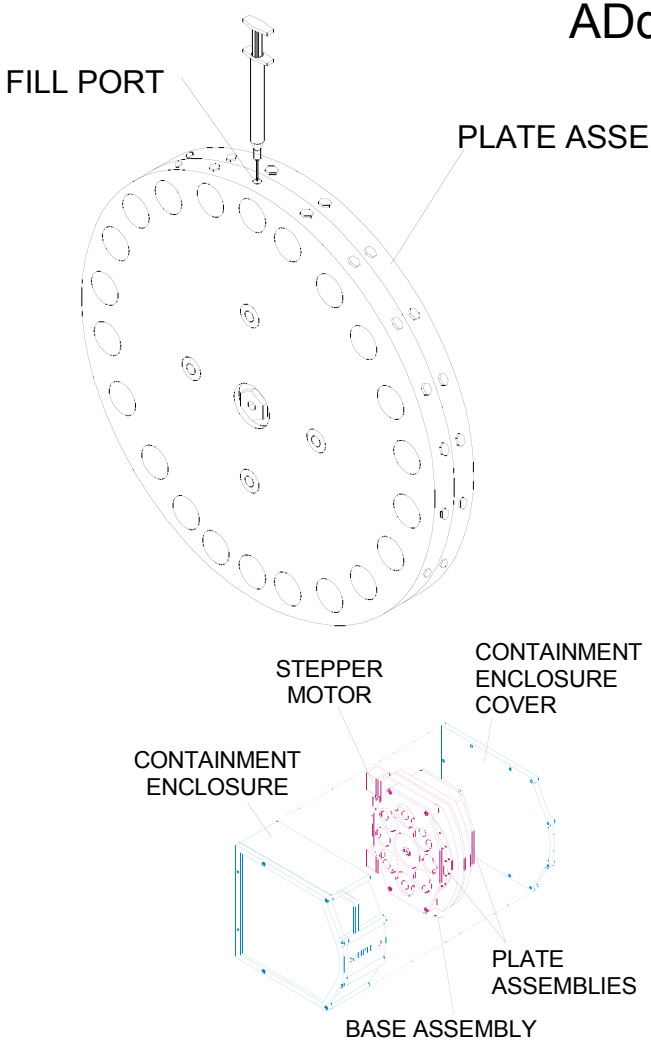
Mixing two fluids during contact

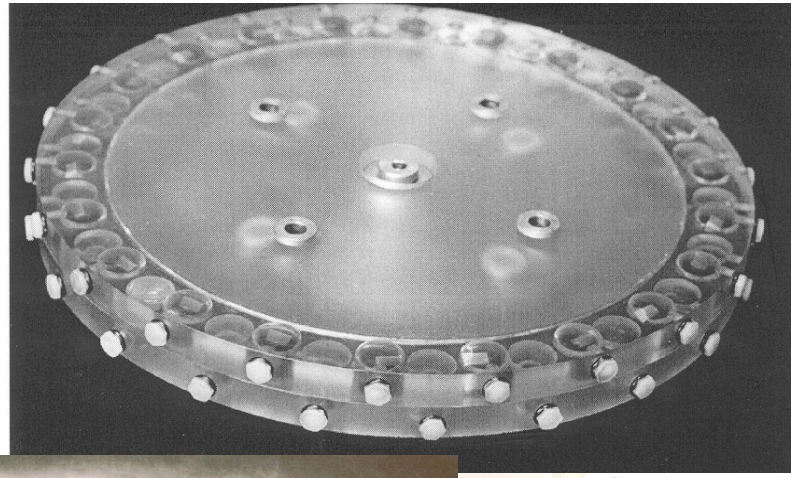


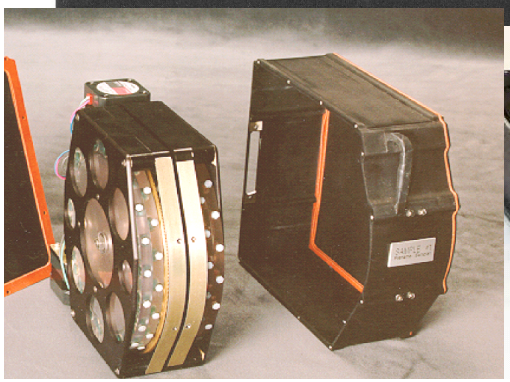
Sliding-cavity principle with a mixing step

ADSEP Cassette Plate Assemblies

ADdvanced SEeparations Processor

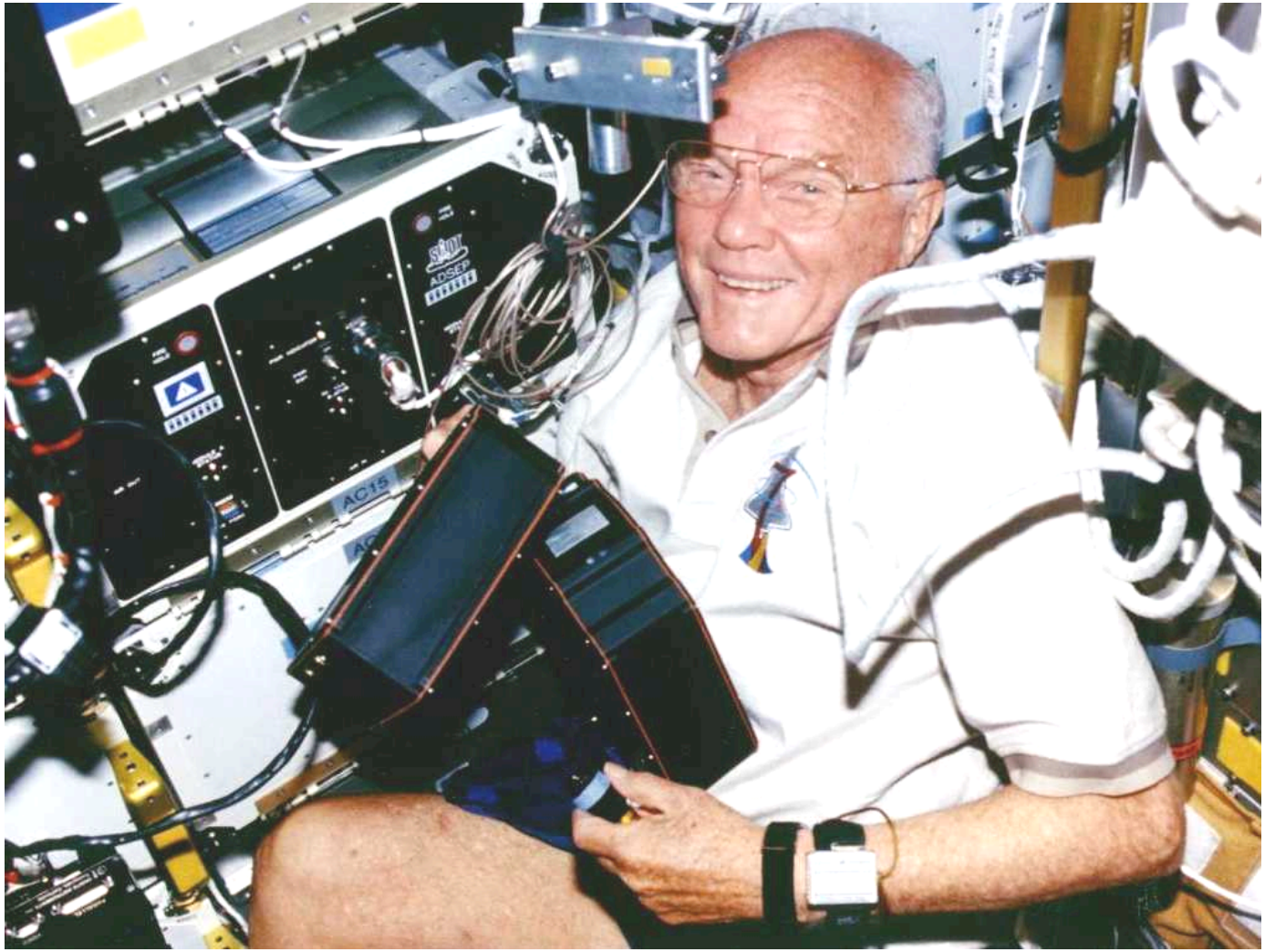






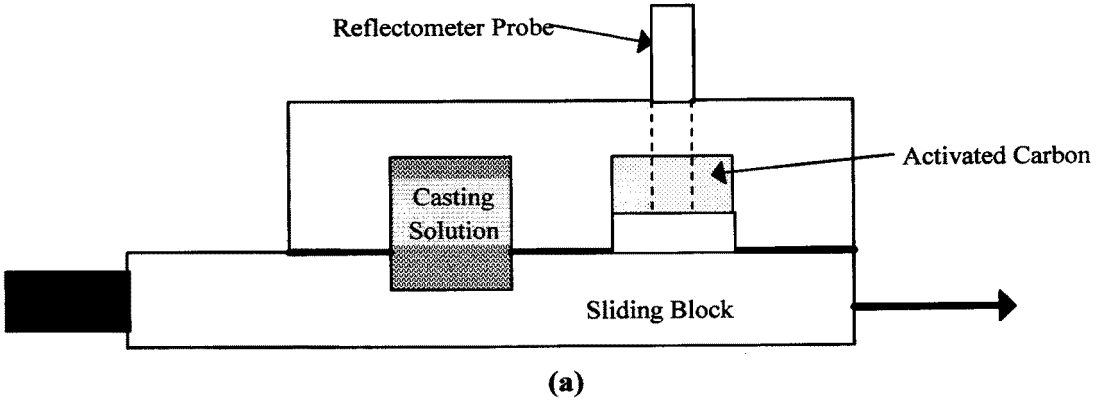
- Up to 44 experiments per cassette
- Hand-held version

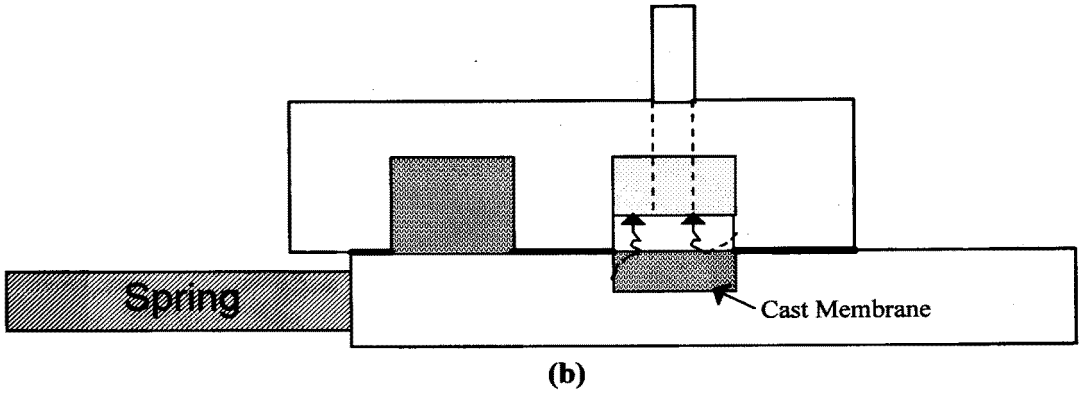
ADSEP Cassettes have flown on space shuttle missions



Sliding-cavity method for evaporative thin-film casting

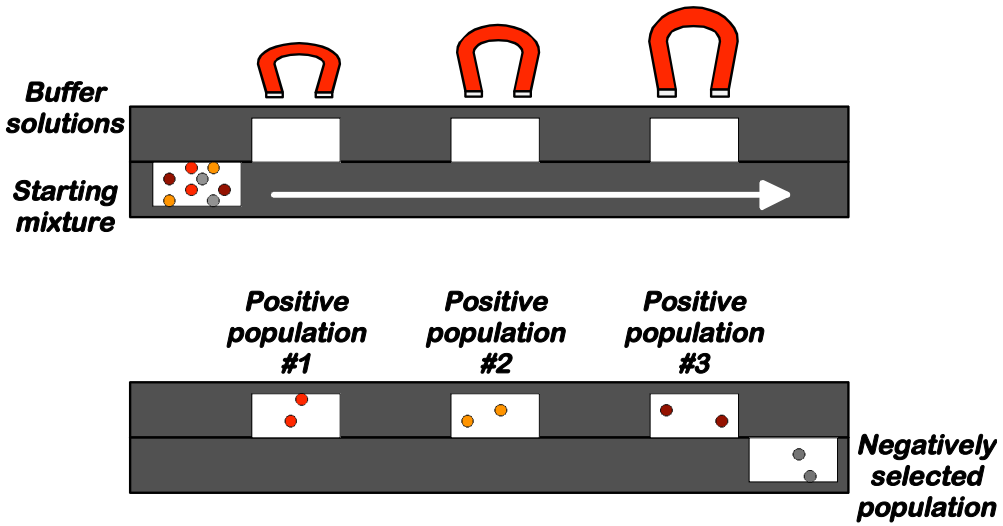
Lower block slides to right bringing casting solution under a chimney of activated carbon that rapidly absorbs solvent

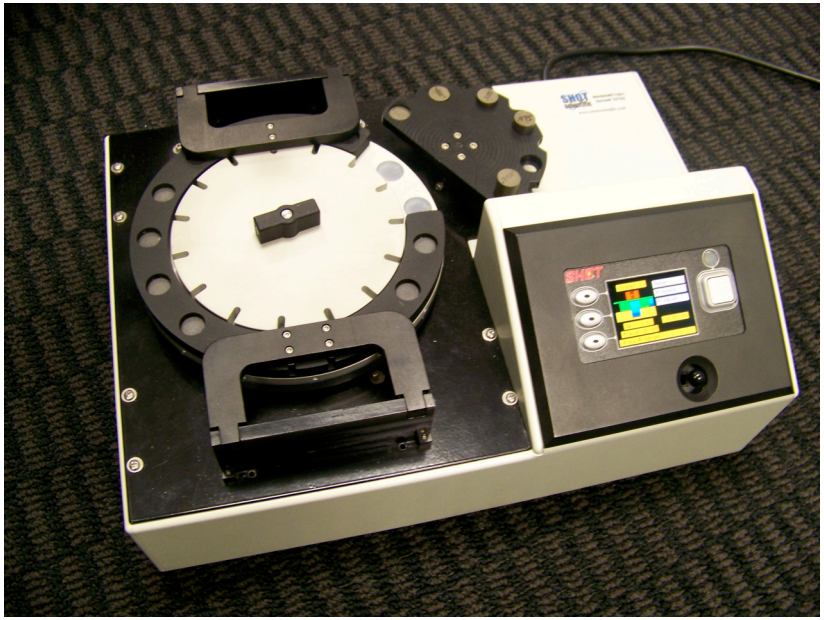




Magnetophoresis Version

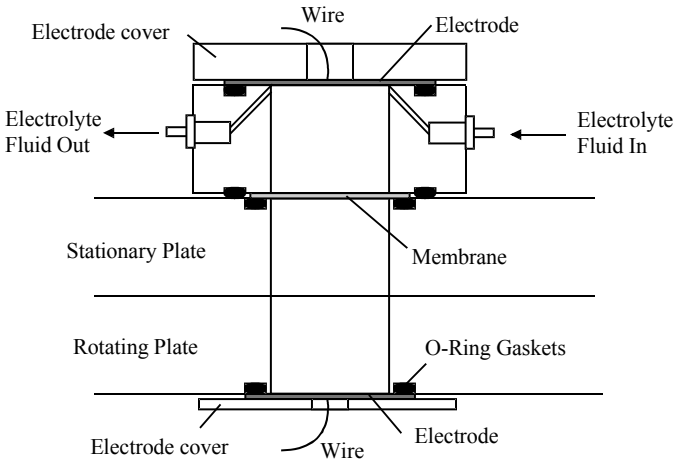
- **Migration times are under 10 min**
- **Versatile input power**

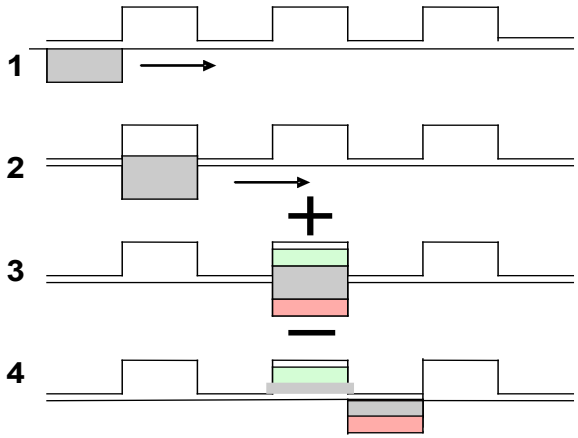


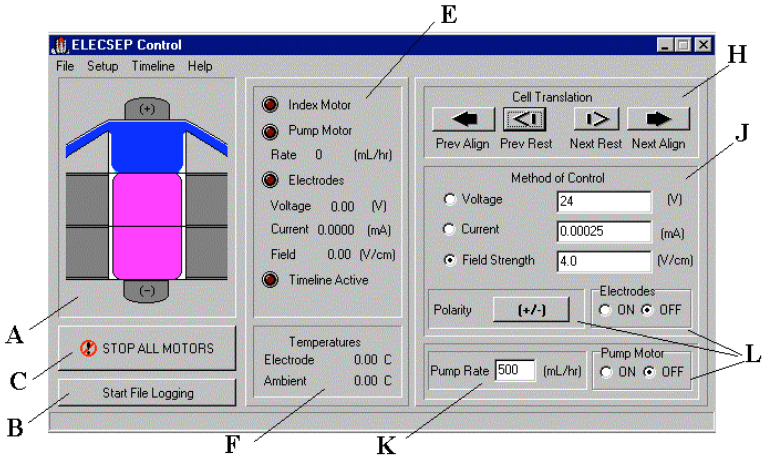


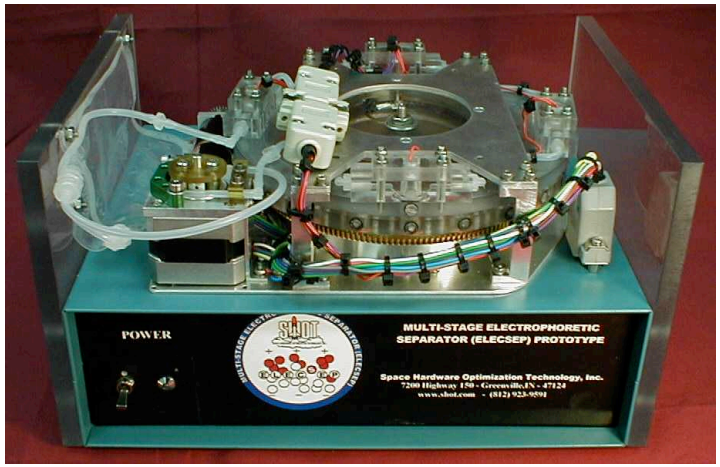
MagSort Lab Module

Electrophoresis Version









Elecsep Lab Module

Conclusions

Sliding-Cavity Hardware can be made available for

- Liquid-liquid interface experiments
- Rapid mixing experiments
- Thin-film formation experiments
- Magnetic transport experiments
- Electrophoresis experiments
- Your experiments

Selected References

P.Todd, W. M. Jennings IV, J. C. Vellinger, J. F. Doyle, K. Barton, N. Thomas, J. Weber, M. E. Wells and M.S. Deuser.. 2nd Pan Pacific Basin Workshop on Microgravity Sciences, AIAA Paper BT-1164 (2001).

S. Konagurthu, W. B. Krantz and P. Todd. Proc. of Euromembrane '95, Vol. 1, 256-261(1996).

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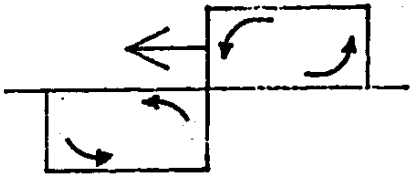
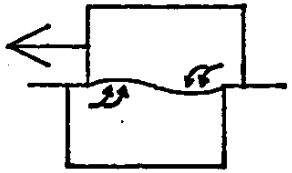
Sliding Transfer Analysis

1. Start



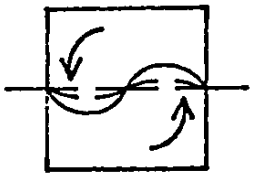
fluid starts rotating

2. Sliding



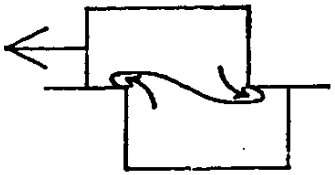
interface is deformed

3. Stop



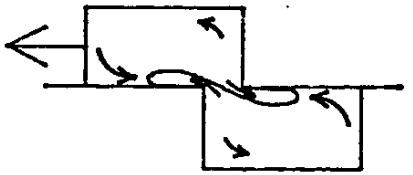
interface swaps comes to rest

Start



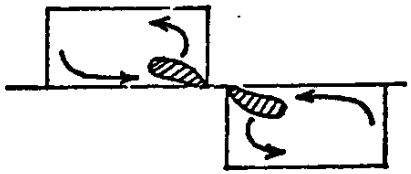
fluid is pushed into other well

5. Sliding



fluid starts rotating again

6. Stop



fluid rotates, comes to rest