

Microfluid mixing due to domain wall movement assisted transport of superparamagnetic beads

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The domain wall movement assisted transport (DOWMAT) of full superparamagnetic particle rows above a magnetic parallel stripe-patterned exchange-bias thin film layer system with in-plane magnetized magnetic domains parallel to the short stripe axes is used for active mixing in a microfluidic device, where the particle rows act as dynamic micro stirring objects while transported.[1] By starting from an initial step-like concentration profile for two different tracer dye solutions used in the experiments, it is shown that the interface and therefore the amount of mixing is strongly related to the particles movement amplitude when applying a sinusoidal movement scheme. Therefore, the mixing speed can be controlledly factored as compared to passive mixing by thermal diffusion.

References:

[1] D. Holzinger, D. Lengemann, F. Goellner, D. Engel and A. Ehresmann, *Appl. Phys. Lett.* **100**, 153504 (2012)