

Application No. 779: Ferrofluid in the glass

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Observe ferrofluid in salt water

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In the following video, I'll show you step by step how you can put ferrofluid into a liquid and observe it without smearing the glass (since ferrofluid adheres to the glass wall) or the ferrofluid dissolving, which is the case with aggressive solvents. This way you can observe the fascinating features of ferrofluid without it leaving stains.

YouTube Video: www.youtube.com/watch?v=EExRsJZSmx0

Material needed

- Tap water in clear container
- Table salt
- Glass container with straight walls and sealing top (e.g. clamp)
- Ferrofluid (www.supermagnete.de/eng/M-FER-10)
- Funnel
- Strong magnet, e.g. Q-19-13-06-N (www.supermagnete.de/eng/Q-19-13-06-N)



Why straight walls on the glass container? Due to light refraction it is hard to observe ferrofluid in bent bottles.

Instructions

1. Pour table salt into the water container and stir until the water is saturated and no more salt is being dissolved.
2. Use a funnel to pour the salt water into the container into the bottle (almost to the brim).
3. Drizzle a few drops of ferrofluid into the bottle. Make sure the ferrofluid drips directly into the water and doesn't come into contact with the glass. The fluid should sink all the way to the bottle bottom and the water does not change color.
4. Seal the bottle (possible with adhesive).
5. Now place a strong magnet on the bottle and experiment with this fascinating liquid.

Caution: The video shows the bottles being completely filled up with water. This is not wise! Small air bubbles are necessary so temperature fluctuations won't lead to cracks in the glass and loss of fluid.

Thoughts on appropriate liquids

I have experimented for a long time to figure out what liquid to use for such trials. Pure water doesn't work because an oily film develops and the water becomes unsightly. The ferrofluid completely dissolves in oily liquids. Ethanol works for a while, but after a few hours the ferrofluid coagulates, so that's not worth it.

Here I only used salt water and it works. I can't really explain it from a chemical perspective, but you can perfectly see (without smeared glass) how fascinating ferrofluid is.

Notes from the supermagnete team: Another customer had the same idea in 2010 and found window cleaner "Potz" to work as well. Be careful though since many of those cleaners may completely dissolve the ferrofluid.

Hence, we like the version with the salt water better, especially because of its simplicity.

Articles used

M-FER-10: Ferrofluid 10 ml (www.supermagnete.de/eng/M-FER-10)

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