



"Suppliers of Ferrofluids for Research and Industry"

Ferrofluids for Domain Observation

Ferrofluid

Ferrofluids are stable colloidal dispersions of single domain magnetic particles, typically 100Å in diameter. The particles are usually Fe₃O₄ (magnetite) and are held in suspension by the use of dispersing agents which are compatible with both the carrier fluid and the magnetic particles. The carrier fluid is usually water or a synthetic oil.

For domain observation work the particles are attracted to the region of maximum field gradient by the force exerted on them due to field gradients which exist at the domain walls. The field gradient causes the particles to aggregate at the domain walls, which manifest themselves as dark lines when viewed by visible light. The separation between the adjacent lines is roughly equal to the size of a domain, the dark line being roughly equal in width to a domain wall, i.e. the transition width between adjacent domains.

Application

Liquids Research Limited produce fluids for both thin film and flexible magnetic media, crystal and amorphous alloys, garnets, steels, and geological rocks. With the DK and DHY range of fluids domain observation is quick and simple.

Preparation

The ferrofluid is applied to the surface of the sample by the use of a glass plate or Q-tip, or alternatively the sample may be dipped in the ferrofluid. Once the fluid has evaporated the domain patterns may be observed under a microscope (x100 magnification) using reflected visible light. For best viewing the light source should be at an angle of 30-45°. An infrared lamp may be used to accelerate the evaporation of the fluid. The domain resolution will depend upon the density of the ferrofluid. The ferrofluid is not used neat from the bottle but is diluted to typically 80 parts dilutant to 1 part ferrofluid. The dilution ratio may be varied to achieve the necessary resolution.

Liquids Research Limited domain observation fluids come prepared with a wetting agent to reduce surface tension on recording media caused by a surface coating of lubricant which tends to make the wetting of the media difficult.

All domain observation fluids have a moderate to high vapour pressure, for this reason fluids should be kept in a closed bottle at room temperature. Any fluid diluted for use should not be stored as it will become unstable relatively quickly.

Ordering Information

<u>Water</u>	<u>Ms (Gauss)</u>	<u>Particle diameter (nm)</u>	<u>Viscosity (cp)</u>
DKS1S9	80	10	<5
DKS1S12	80	10	<5

<u>Hydrocarbon</u>	<u>Ms (Gauss)</u>	<u>Median Particle size (nm)</u>	<u>Viscosity (cp)</u>
DHYS1-A	80	6	<5
DHYS1-B	80	8	<5
DHYS1-C	80	10	<5

If the above fluids do not meet with your requirements please do not hesitate to contact us so that a fluid to your specification can be formulated. Quotations provided via fax or email usually within 48 hours.

Health and Safety

Ferrofluids are not classed as hazardous materials. Normal laboratory health and safety procedures should be practised when handling any ferrofluid. Rubber or latex gloves and goggles should be worn. In case of contact with skin the affected area should be washed with mild soap and water. In case of eye contact, the eyes should be flushed with plenty of clean water for 15 minutes. All our ferrofluids are supplied with a safety sheet.

For further information please contact our technical department at the address below.

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