Magnetic nanoparticles could aid heat dissipation

Thermal conductivity coefficient of water: 0.56 W/m K

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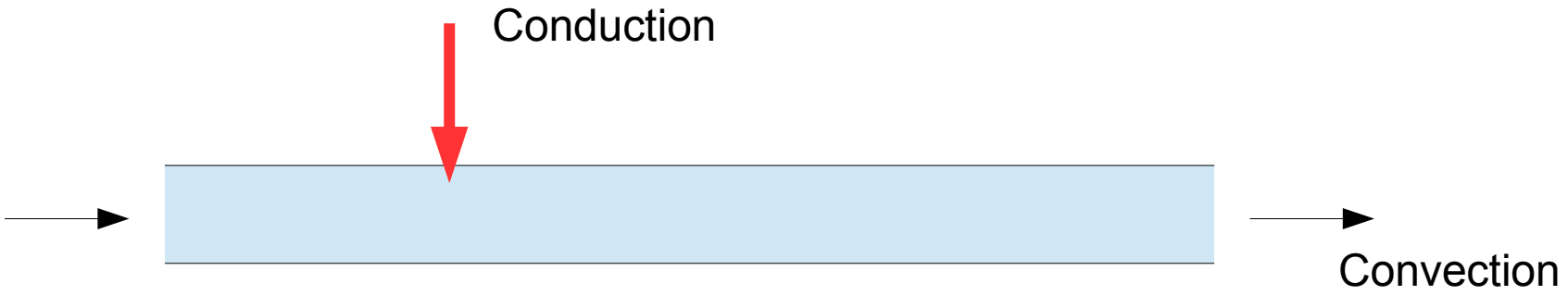

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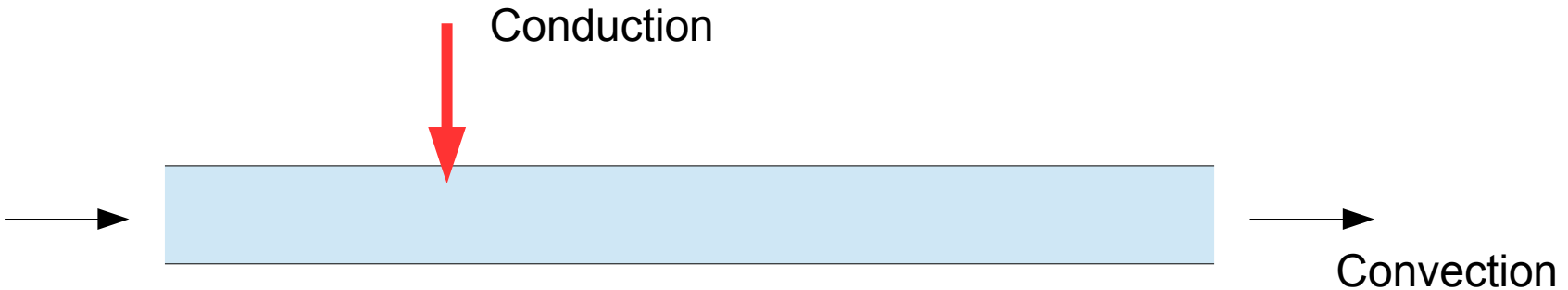

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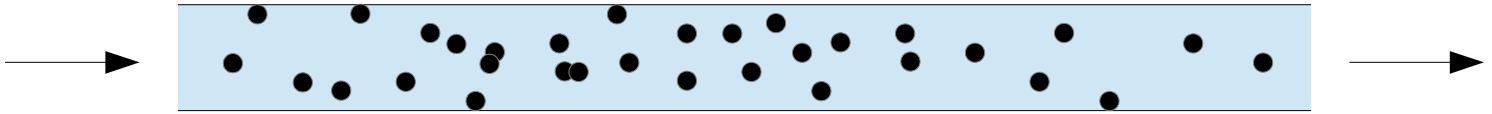
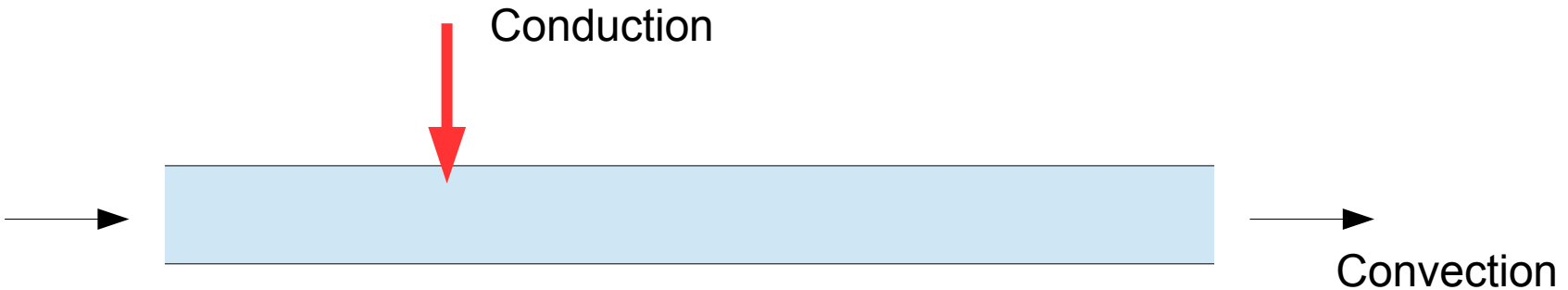


Thermal conductivity coefficient of magnetite (Fe_3O_4): ~1 W/m K

When magnetite nanoparticles are added (called nanofluid), no difference found in the heat dissipation rate.

Magnetic nanoparticles could aid heat dissipation



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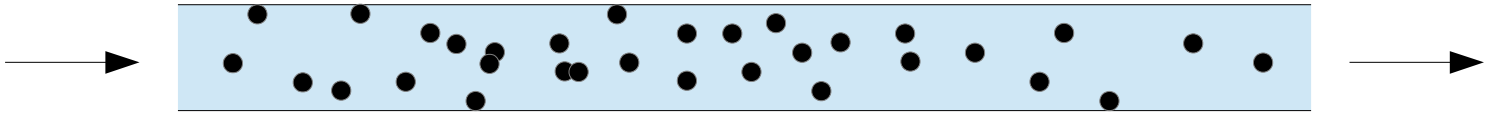
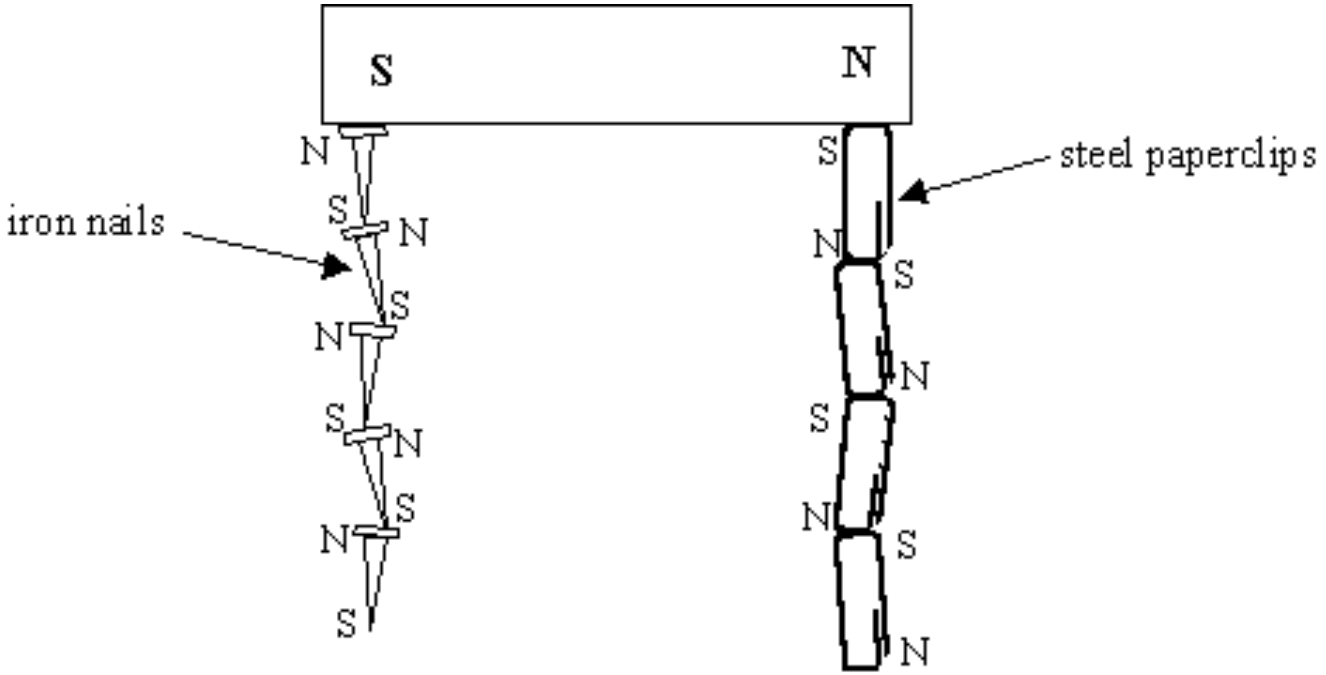
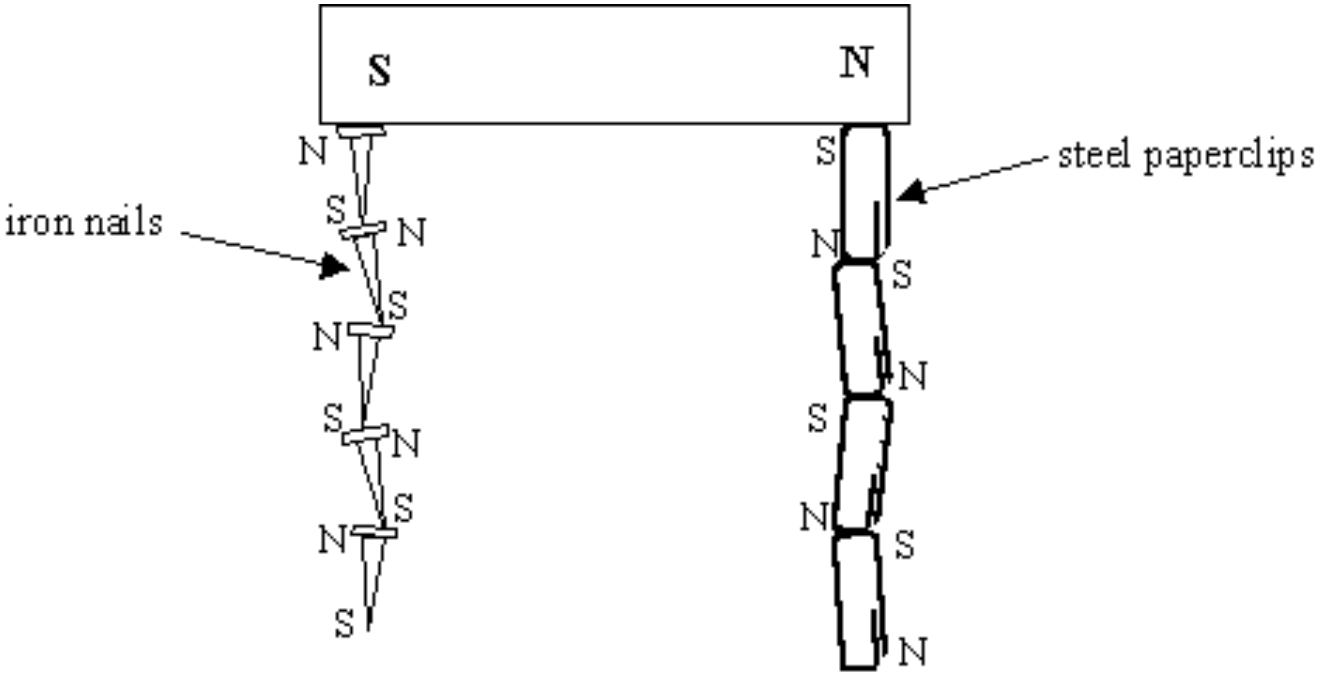


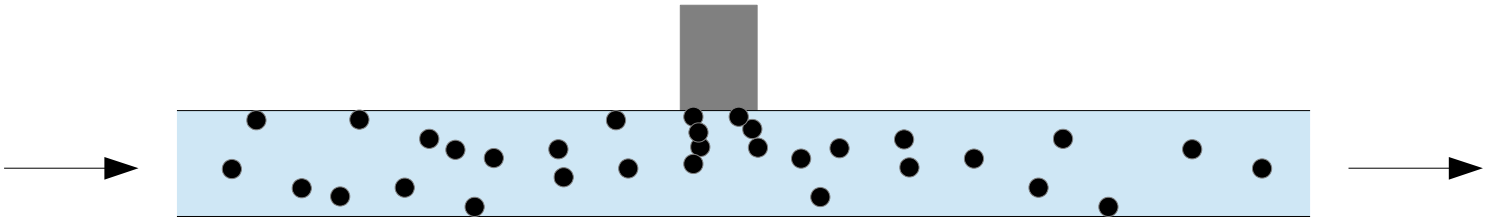
Thermal conductivity coefficient of magnetite (Fe_3O_4): ~1 W/m K

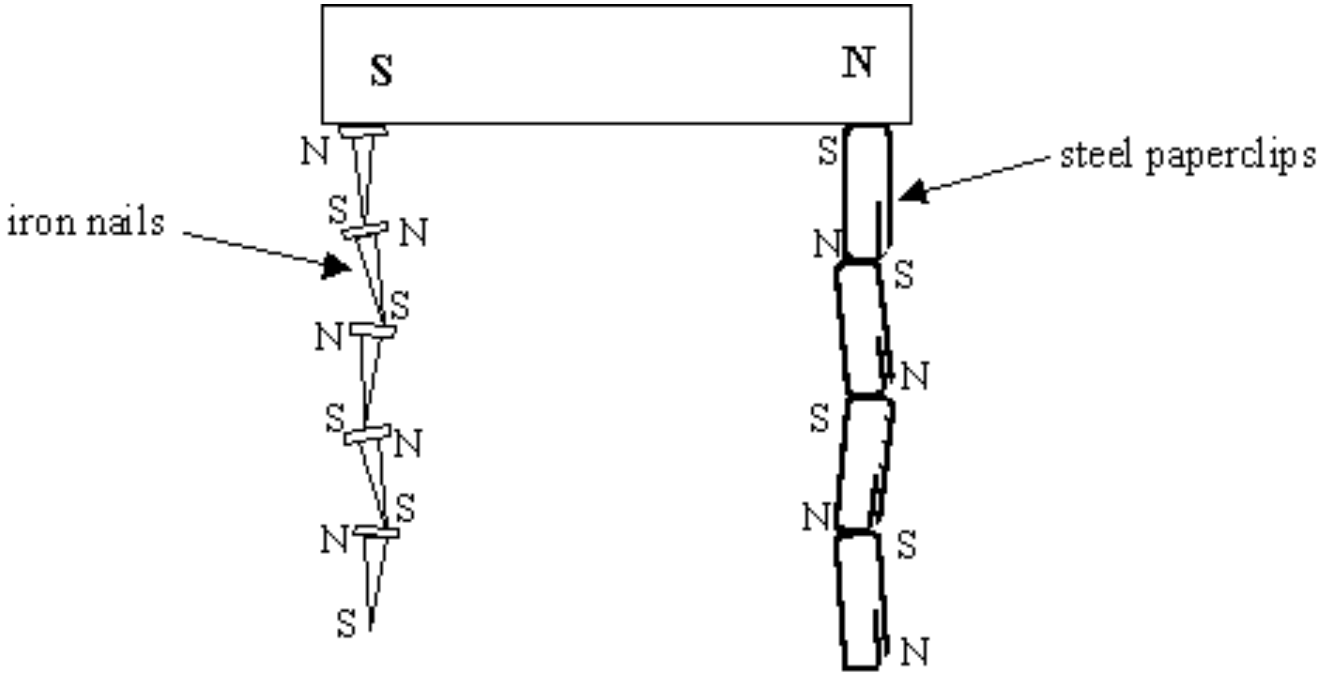
When a magnet is placed outside of the tube, what will happen?


S
N
iron nails
steel paperclips



Chain-like connections





(1) Higher thermal conductivity of magnetite as well as (2) the increase contact surfaces