

4.4.3 Summary to: Technical Materials and Applications

Uses of ferromagnetic materials may be sorted according to:

- Soft magnets; e.g. **Fe** - alloys
- Hard magnets; e.g. metal oxides or "strange" compounds.

- Everything profiting from an "iron core": Transformers, Motors, Inductances, ...
- Shielding magnetic fields.

- Permanent magnets for loudspeakers, sensors, ...
- Data storage (Magnetic tape, Magnetic disc drives, ...)

Even so we have essentially only **Fe**, **Ni** and **Co** (+ **Cr**, **O** and **Mn** in compounds) to work with, innumerable magnetic materials with optimized properties have been developed.

- New complex materials (including "nano"materials) are needed and developed all the time.

Strongest permanent magnets:
Sm₂Co₁₇
Nd₂Fe₁₄B

Data storage provides a large *impetus* to magnetic material development and to employing new effects like "**GMR**"; giant magneto resistance; a purely quantum mechanical effect.