4.4.3 Summary to: Technical Materials and Applications

- Uses of ferromagnetic materials may be sorted according to:
  - Soft magnets; e.g. **Fe** - alloys

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

  - Hard magnets; e.g. metal oxides or "strange" compounds.

    - **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:
Sm_2Co_{17}
$Nd_2Fe_{14}B$

- 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.