## 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.
- 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.

Strongest permanent magnets: Sm<sub>2</sub>Co<sub>17</sub> Nd<sub>2</sub>Fe<sub>14</sub>B