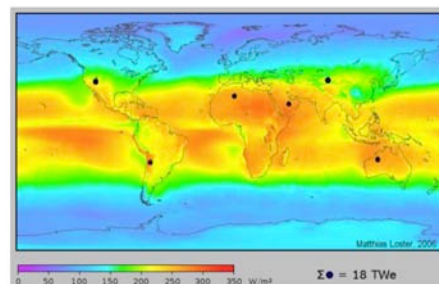
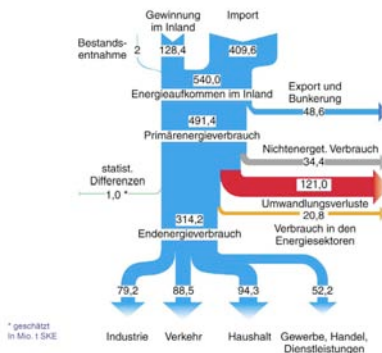
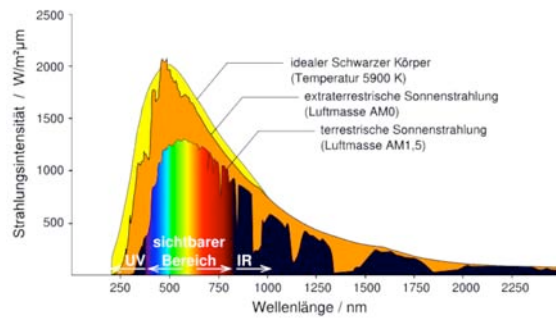
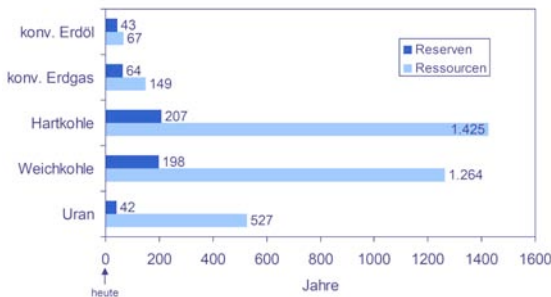
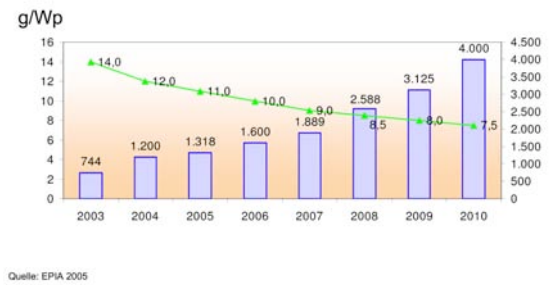
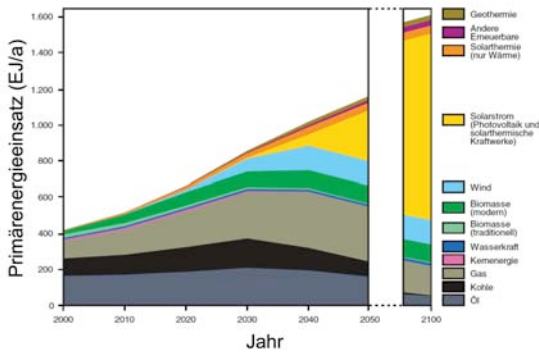
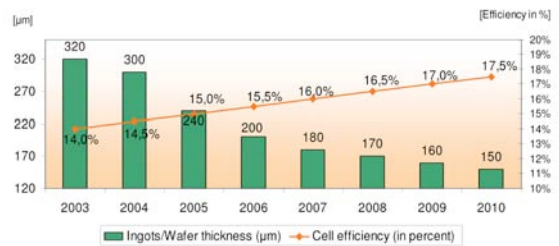
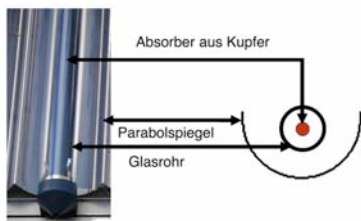
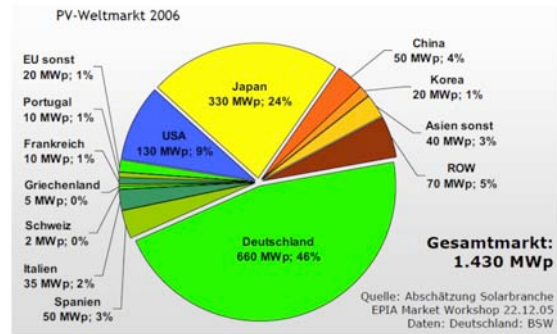
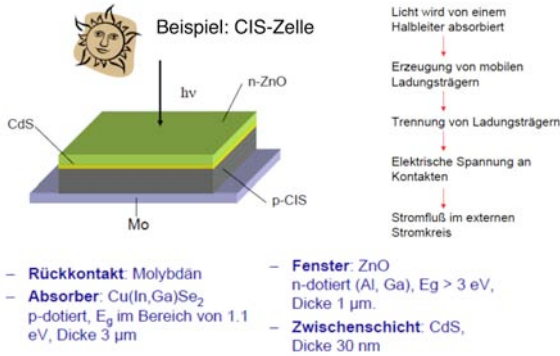
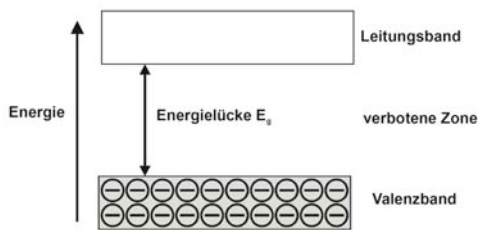
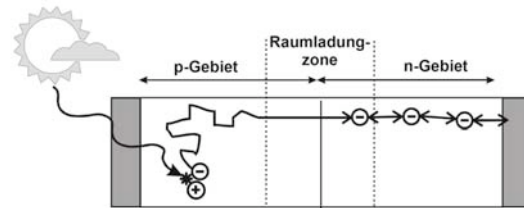
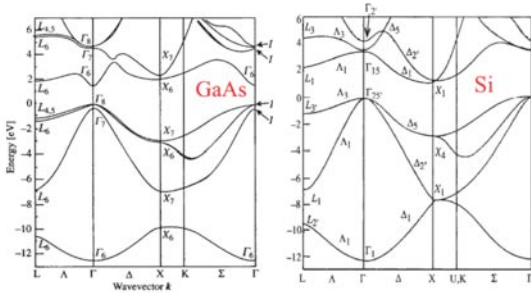
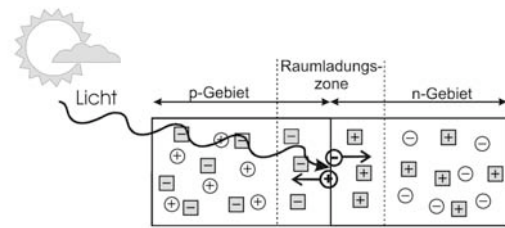
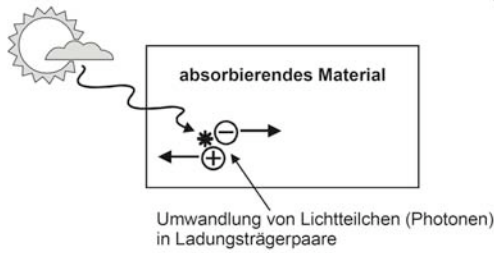


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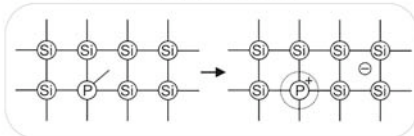


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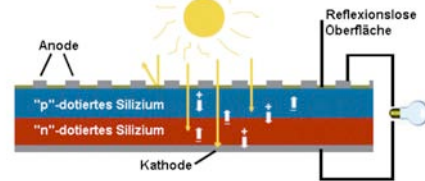
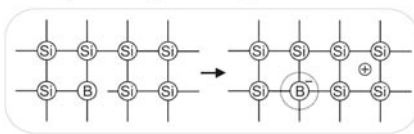


- Dünnschichten
- Amorphes Silizium (a-Si) → Einfach-Solarzelle
  - Mikrokristallines Silizium (μc-Si) → Mehrfach-Solarzelle
  - Mischung (μc- und a-Si) → Mehrfach-Solarzelle
  - CdTe- und CIS-Zellen → Mehrfach-Solarzelle (Nicht hier behandelt)

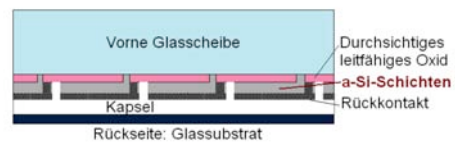
n-Dotierung (z.B. mit Phosphor)



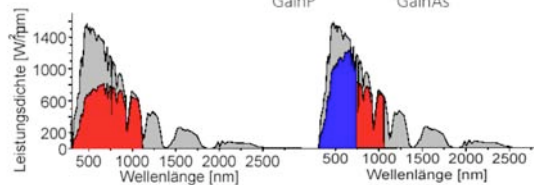
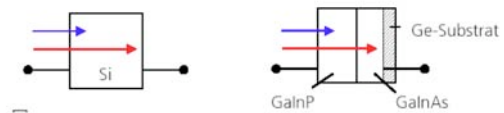
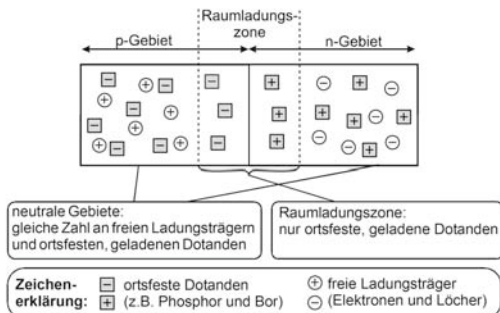
p-Dotierung (z.B. mit Bor)



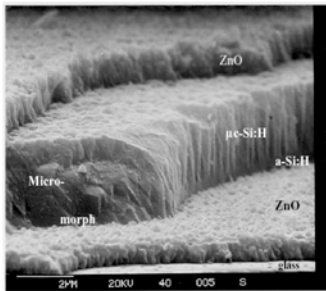
- a-Si:H
- Leitfähigkeit <math>< 10^{-10}</math> S cm<sup>-1</sup> (sehr schwach)
  - a-Si:H bedeutet „mit H dotiertes amorphes Si“
  - Rolle von H: Die Leitfähigkeit drastisch verringern (bis zu 10<sup>-15</sup> S.cm<sup>-1</sup>)



Wirkungsgrad: 5 – 7 %

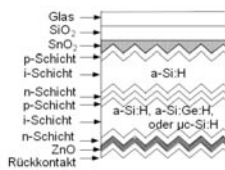


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$\mu\text{c-Si} + \text{a-Si}$  → Mehrübergang: Mehrere p-i-n-Schichten **aufeinander**  
 → **Ziel:** Die **Bandlücke** verringern

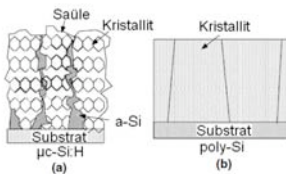
Die Zelle mit Mehrübergang besteht in aufeinander gelegten Zellen mit Einübergang:



Wirkungsgrad: **6 - 7 %**

$\mu\text{c-Si} + \text{a-Si}$  → Mischung von  $\mu\text{c-Si}$  und **a-Si**  
 → **Ziel:** Die **Bandlücke** immer kleiner machen

(a) Mischung von  $\mu\text{c-Si}$  und a-Si. (b) Polysilizium, im Vergleich



Wirkungsgrad: **8 - 10 %**

