SHINING but GREEN?

Substitution of Hexavalent Chromium

By
Andreas Junker-Holst

DTU

MEK - Department of Mechanical Engineering

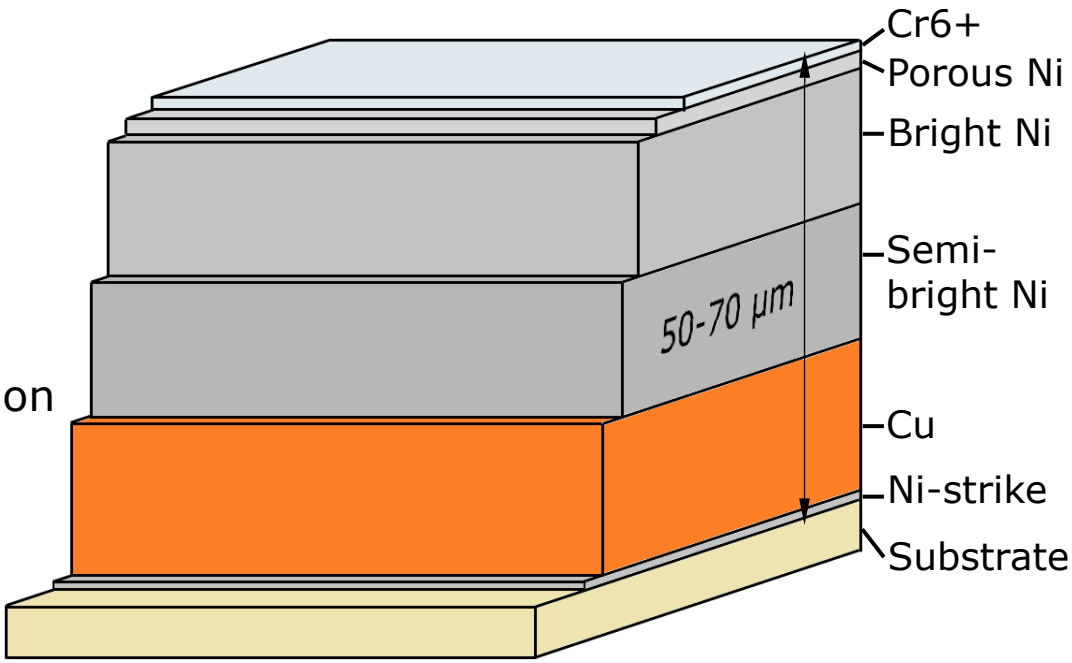
Chromium is a ”design classic”

Conventional Chromium Surfaces

- Hexavalent Cr6+ plating:
  - Carcinogen and mutagen
  - Toxic to humans
  - Use of bio-persistent PFOS mist suppressants

- Nickel release from surface:
  - Contact dermatitis risk

- Multiple layers:
  - Large material consumption

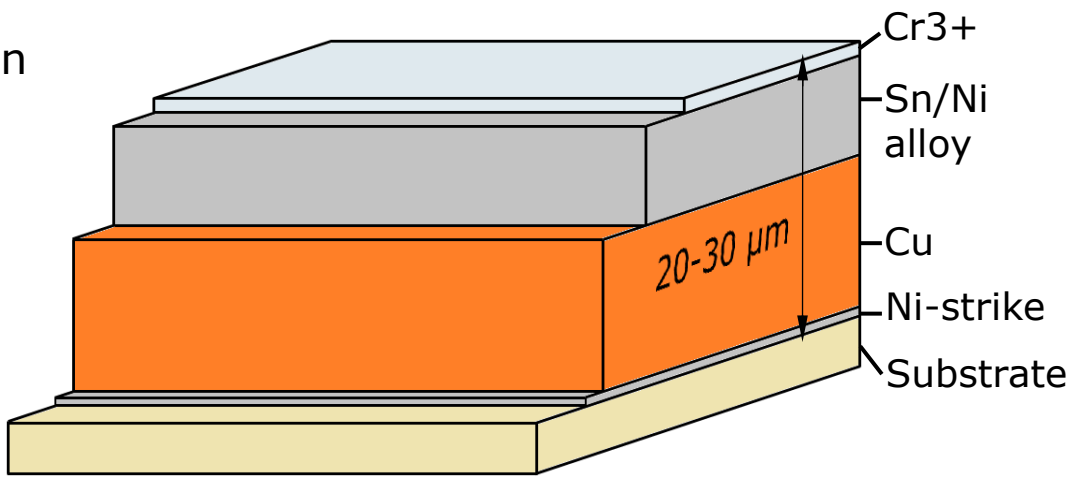


Alternative Chromium Surface

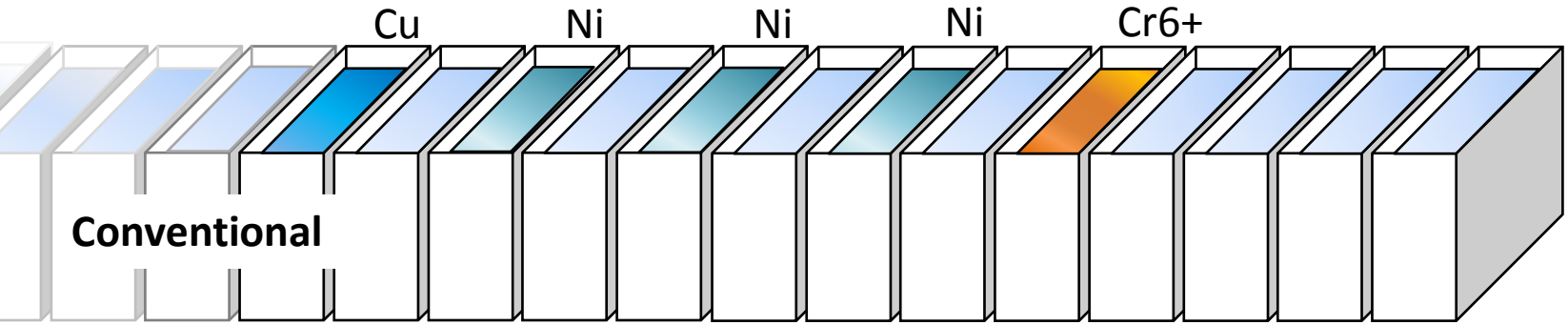
- Trivalent Cr3+ plating:
  Harmless chemistry

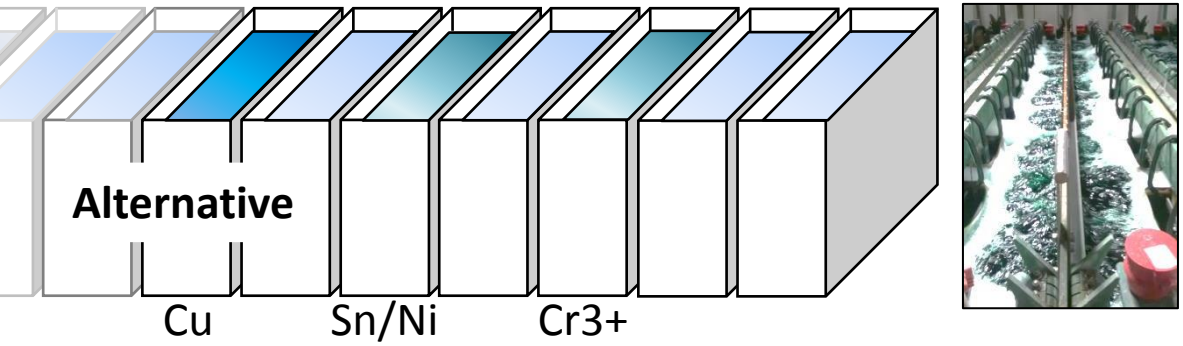
- Sn/Ni alloy plating (The innovative part)
  Extremely corrosion resistant
  No nickel release

- Fewer layers:
  Less material consumption
  Cheaper materials



Reduced energy consumption and waste production





In the final plating steps:

- 50% reduction of water usage (incl. treatment)
- 40% fewer heated tanks
- Higher plating efficiency

Estimated 30-50% reduced energy consumption

Conclusion

Outline the main benefits:

- No Cr6+ ~~Carcinogen~~, ~~Mutagen~~
- No PFOS ~~Persistent and Bio-accumulative substances~~
- No nickel release ~~Contact dermatitis~~
- Less layers Save (expensive) materials

Save energy in manufacturing

- Improved corrosion resistance Increased lifetime
- Recyclabe materials? Yes

Close collaboration with industry in Denmark, Germany and USA. Patent pending solution. **Elplatek**

SHINING and GREEN

GRØN DYST

DTU

MEK - Department of Mechanical Engineering