



Nickel

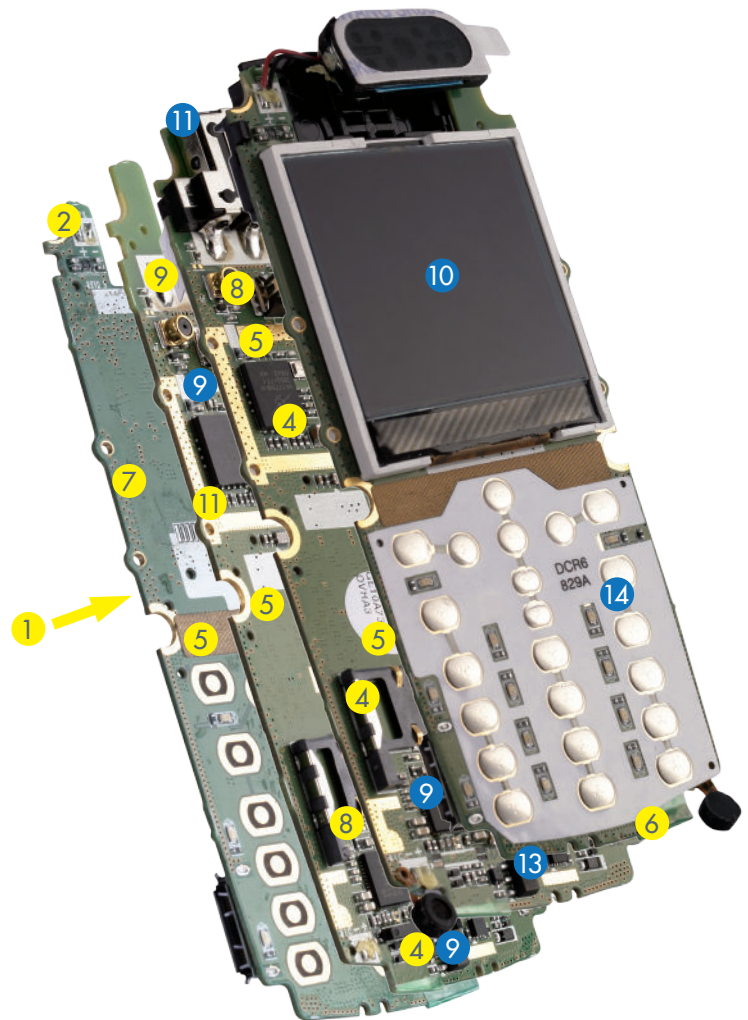


Other Coatings



Without nickel and without coatings, you would have no cell phone.

Nickel is essential for any battery (Li-ion, Ni metal hydride, Ni-Cd). It makes lead-free solder possible while also preventing electromagnetic interference and corrosion. Without Ni, your cell phone would quickly become a useless piece of electronic junk.



No Nickel, No Electronics

1. Li ion battery anode $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$
2. Antenna - NiTi shape memory alloy
3. EMI shielding - Ni paint or Cu plate with Ni overlay, or composite case made of Ni plated carbon fibers in plastic
4. Wire bond, every chip - Ni/Pd/Au coating
5. Diffusion barrier, every chip and board – lead-free solder cannot be done without electroless Ni immersion Au coating (ENIG)
6. Microphone - electroless/electroplated Ni on mylar
7. Circuit board, SIM card - Ni plate on Cu for oxidation protection
8. Ceramic capacitors - Ni on electrodes, interconnects

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Without coatings, modern electronics would not exist.

Almost everything you see and feel on your cell phone is some type of coating. All electronics are built from coatings of different materials. Without coatings, your touch screen would be just a sheet of glass.

No Coatings, No Cell Phones

9. Electronics are made almost entirely of complex stacks of coatings - doped Si, SiO_2 , Cu, Au, Ni, Cr, Ni/Pd/Au
10. Touch screen - indium tin oxide makes LCD screens conductive, patterned metal or ITO coating for sensing, Mo/Al/Mo border. Coatings reduce scratches, finger friction and glare, repel oil
11. Camera optics - antireflective lens coatings
12. Decorative coatings - paint, anodize, electroless Ni for plating on plastic, Cr trim
13. Conformal polymer coatings to protect from water and inhibit tin whiskers from non-lead solder
14. Inks to print information onto components, chips, circuit boards