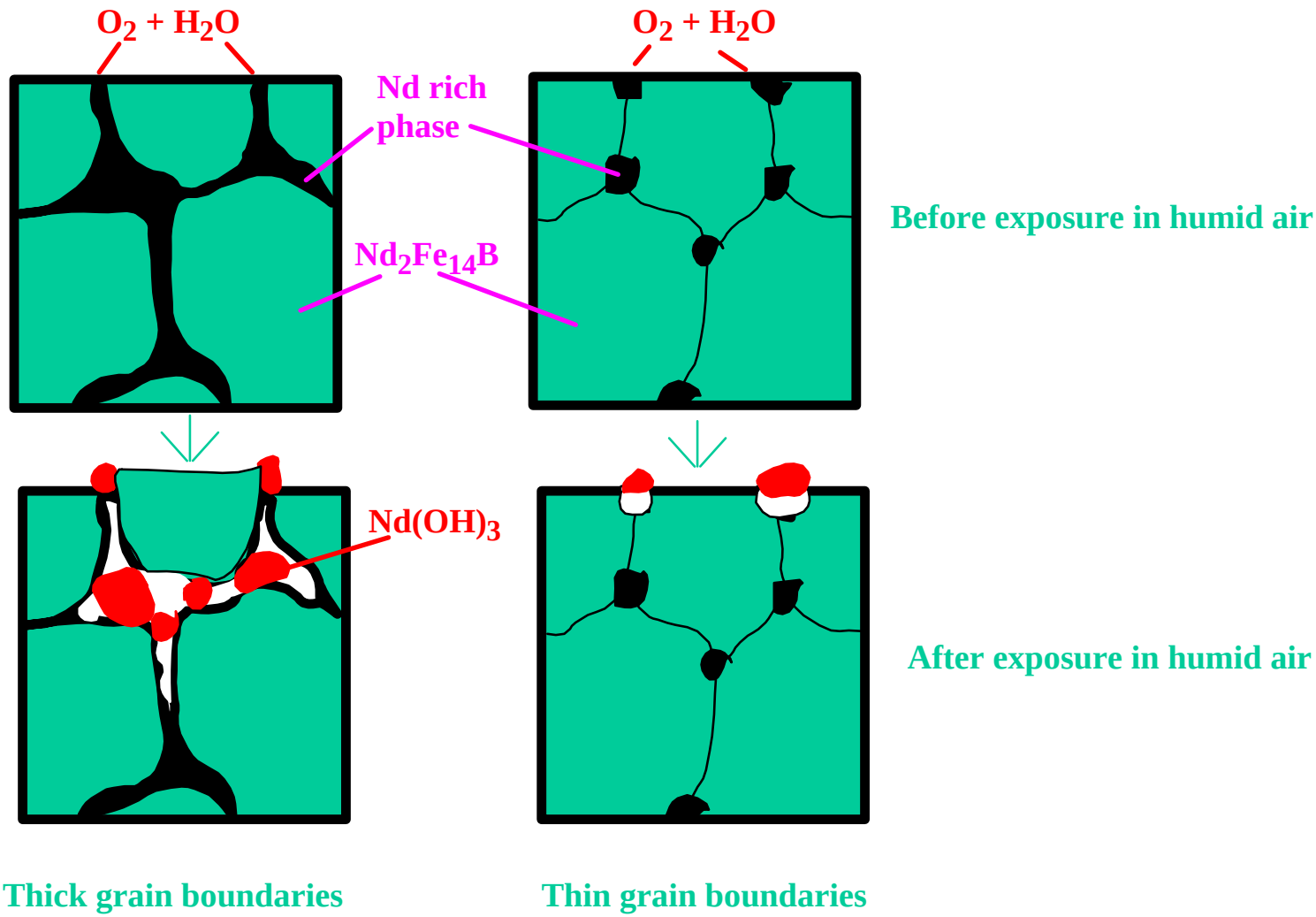
Neodymium Iron Boron magnets

Corrosion process

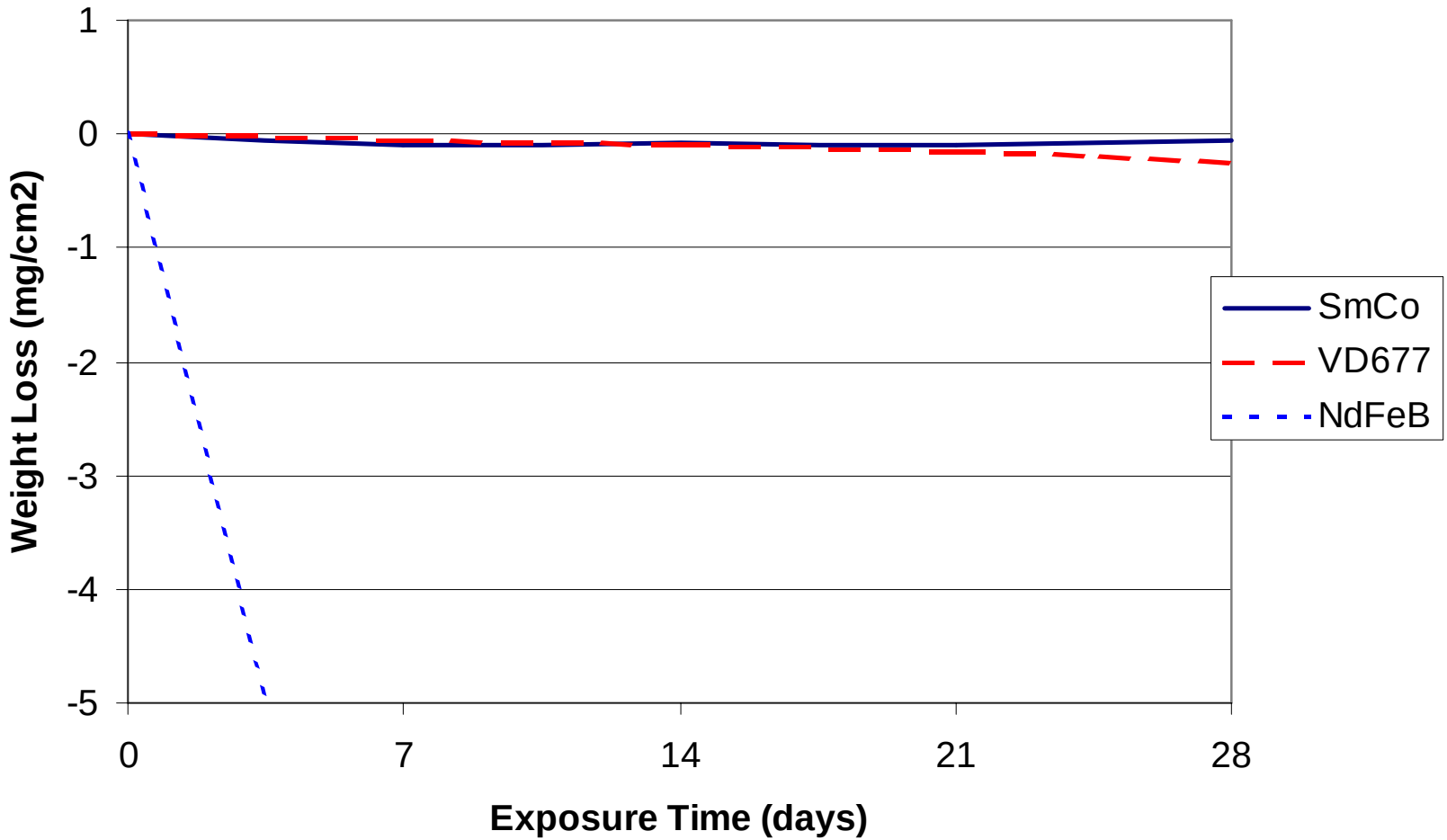


Neodymium Iron Boron Magnets
Better corrosion resistance is achieved by:

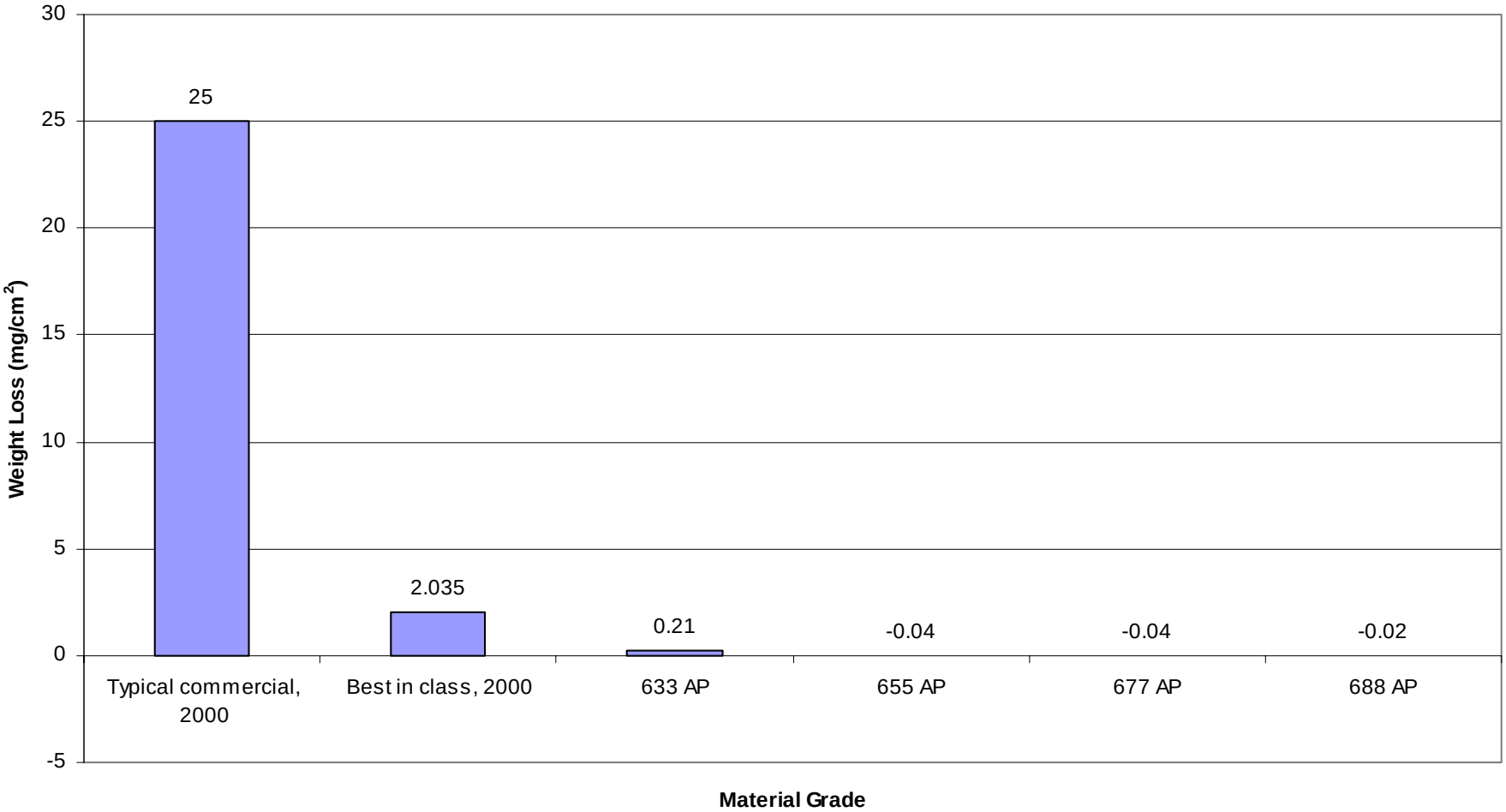
- Minimizing the Neodymium rich phase
- Developing corrosion resistant intermetallic compounds as the grain boundary phase
- Avoiding open porosity, cracks, laminations, etc.
- Designing with minimum surface area.

Improvements to NdFeB Magnet Corrosion Resistance

(Highly Accelerated Stress Test: 130C, 2.7 bar; 100% Relative Humidity; Bare Magnets)



Bare Magnet Corrosion Test Results
96 Hour Autoclave Test (130C, 2.7 Bar, Steam)



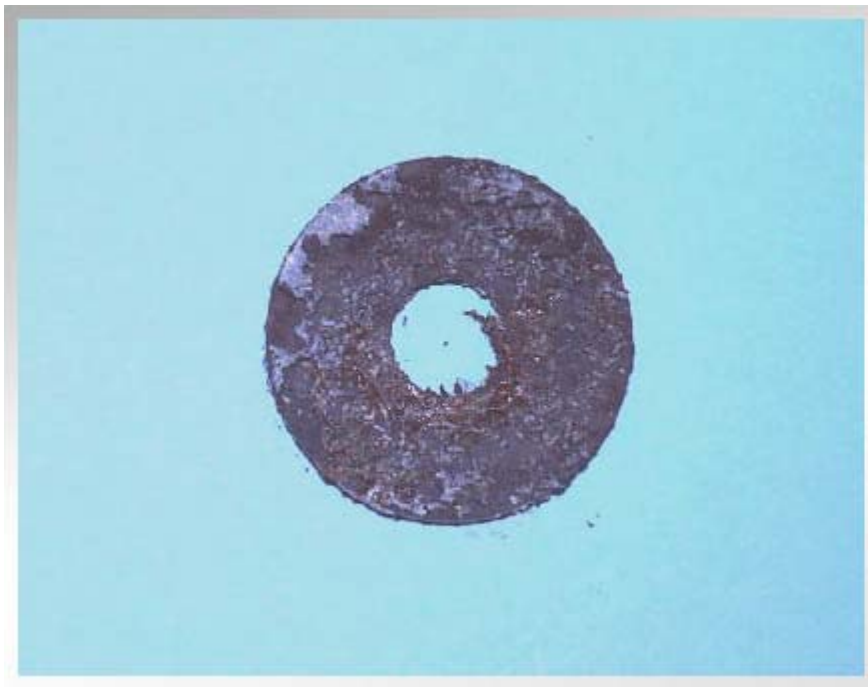
VACODYM Corrosion Protection

Coating	Minimum Thickness	Hardness	Corrosion Resistance	Temperature Limit
Nickel	10 μm	HV 300	Humidity	210 °C
Tin	15 μm	HV 20	Humidity	< 160 °C
Everlube	5 μm	4H	Humidity Salt Spray Industrial solvents	< 210 °C
Aluminum IVD	10 μm	HV20	Humidity Salt spray	210 °C

Plating alone is not the answer

Even with electrolytic zinc, these magnets were not able to survive the automotive under-the-hood environment

With the right magnet and plating…



Supplier X: electrolytic Zn after 130ºC/ 2.7 bar/ 100% humidity

VACODYM 6xx: electrolytic Ni+Sn after 130ºC/ 2.7 bar/ 100% humidity