8 METALS FOR FLEXIBLE PACKAGING METALLISATION

Complete property comparison — why Aluminium dominates the industry (Apr 2026 reference)

METAL	Symbol	Boiling Point (°C)	Cost (₹/kg)	vs Al (ratio)	Density (g/cm³)	Barrier Quality	Food Safety	Recycl-ability	Industry Status
ALUMINIUM	**Al**	**2,470**	**~380**	**1×**	**2.70**	**Excellent**	**GRAS ✓**	**Infinite**	**STANDARD**
Silver	Ag	2,162	~2,60,000	~680×	10.49	Excellent	Safe	Good	Luxury only
Copper	Cu	2,562	~1,250	~4×	8.96	Good	Reacts	Good	Non-food
Gold	Au	2,856	~1.53 cr	~40,000×	19.32	Excellent	Inert	Fair	Cosmetic
Zinc	Zn	907	~300	~0.8×	7.14	Moderate	Toxic risk	Good	Rare
Tin	Sn	2,602	~3,000	~8×	7.31	Good	Safe	Good	Phased out
Chromium	Cr	2,671	~400	~1×	7.19	Excellent	Cr(VI) ✗	Fair	Non-food
Nickel	Ni	2,913	~1,700	~5×	8.91	Good	Allergen	Good	Industrial

WHY ALUMINIUM WINS

Only metal that simultaneously scores well on barrier + cost + safety + recyclability + evaporation temperature. No single property is #1, but the balance is unbeatable.

THE 40nm RULE

At 40nm thickness, any pure metal blocks 99.9% of oxygen, light, moisture. Silver and gold offer NO barrier advantage over aluminium — only higher cost.

WHERE AL DOESN'T WIN

Transparent packaging → AlOx or SiOx
Antimicrobial need → Silver
Luxury aesthetic → Gold
RFID shielding → Copper

Prices verified: April 2026
Sources: MCX, NALCO P1020, Hindalco, BALCO, Delhi/Mumbai spot, LME, Indian bullion markets. Absolute values fluctuate daily; cost RATIOS remain stable across decades.