Long-Term Durability of Materials in a Dry Cave Environment

This document compares the long-term stability and degradation of various materials placed in a dry, stable cave environment with minimal humidity, no UV exposure, and no physical disturbance. The table ranks materials by their resistance to chemical or structural failure over thousands to millions of years.

Durability Table

Material	Degradation Mechanism	Rate	Failure Time	Long-Term Behavior
Stone (granite, basalt)	Erosion, microfractures	Geological	1,000,000+ years	Outlasts civilizations
Titanium	None (passivates)	~0.00001 mm/yr	100,000-300,000 yrs	Nearly indestructible
Gold	None	Zero	Indefinite	Untarnished forever
Platinum	None	Zero	Indefinite	Eternally stable
Glass	Surface leaching	~0.000001 mm/yr	100,000+ years	Chemically inert, fragile
Ceramic	Fracture (brittle)	N/A	Indefinite	Immune to decay, breaks if droppe
Bronze	Patina, slow oxidation	~0.0005 mm/yr	5,000-10,000 yrs	Gradual aging, remains strong
Stainless Steel	Corrosion, crevice attack	~0.0003 mm/yr	3,000-4,000 yrs	Eventually weakens
Silver	Tarnish (sulfur)	Surface only	Indefinite	Darkens but strong
Polymers	Oxidation, embrittlement	Fastest	300-500 yrs	Degrades to flakes

Summary Rankings

1. Gold - Chemically immortal and untarnishable.

2. Platinum - Nearly as stable as gold, very inert.

3. Stone - Erodes over millions of years only.

4. Titanium - The best modern metal for millennia.

5. Glass - Chemically immortal if protected.

6. Ceramic - Durable but brittle.

7. Bronze - Slowly degrades but remains recognizable.

8. Silver - Structurally sound, may tarnish.

9. Stainless Steel - Long-lived but eventually corrodes.

10. Polymers - Shortest-lived, breaks down in centuries.