

UNIT 4 • d- AND f-BLOCK ELEMENTS

Alloy Formation

The structural physics of homogeneous solid solutions.

Metallic radii within ~15% → true alloy

IF [Radius A $\approx$ Radius B] + [Random Distribution]
THEN [Homogeneous Solid Solution]

Because transition metals share similar atomic radii and characteristics, they readily pass this physical constraint.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



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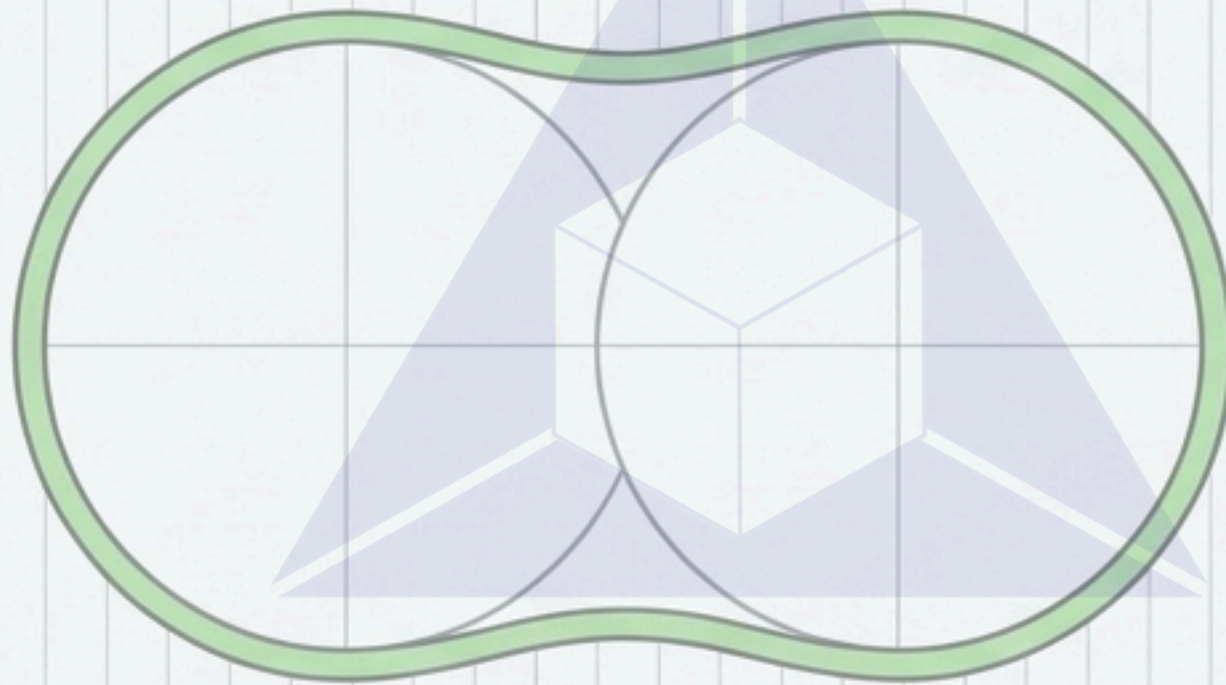
Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
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THE FIT

< 15% Difference



Atoms slide into the crystal lattice seamlessly. Structure remains stable.

THE FRACTURE

> 15% Difference



Lattice distortion. Atoms cannot randomly distribute without breaking the metallic structure.

High-Yield Alloy Profiles

Ferrous Alloys [Cr, V, W, Mo, Mn]

Hard, high melting points. Essential for production of various steels and stainless steel.

Brass [Cu + Zn]

Transition metal + Non-transition metal.

Bronze [Cu + Sn]

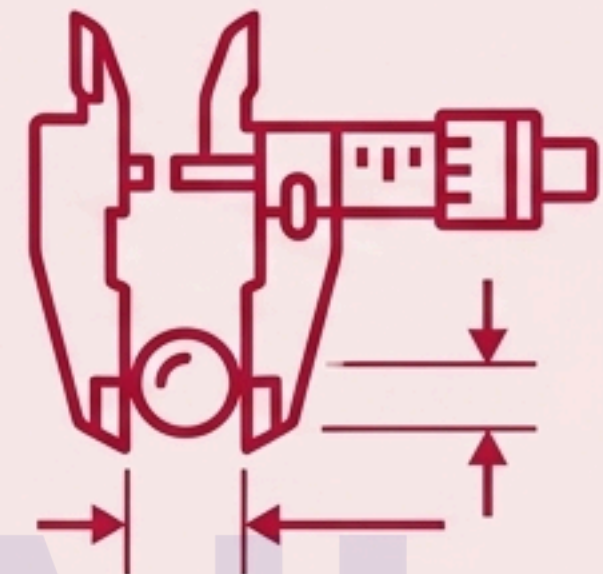
Transition metal + Non-transition metal.

Watch for this in MCQs

~~Assuming ANY two transition metals will form an alloy simply because they are metals.~~

Radius similarity is the gatekeeper.

Metallic bonding alone isn't enough. The strict $<15\%$ size tolerance is the absolute physical requirement for forming a homogeneous solid solution.



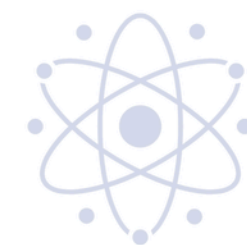
Key Takeaways

- Alloys are **homogeneous solid solutions** requiring a metallic radii match within **~15%**.
- Because of their similar atomic sizes, transition metals readily form hard, high-melting-point alloys—including **Ferrous steels, Brass (Cu-Zn), and Bronze (Cu-Sn)**.



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