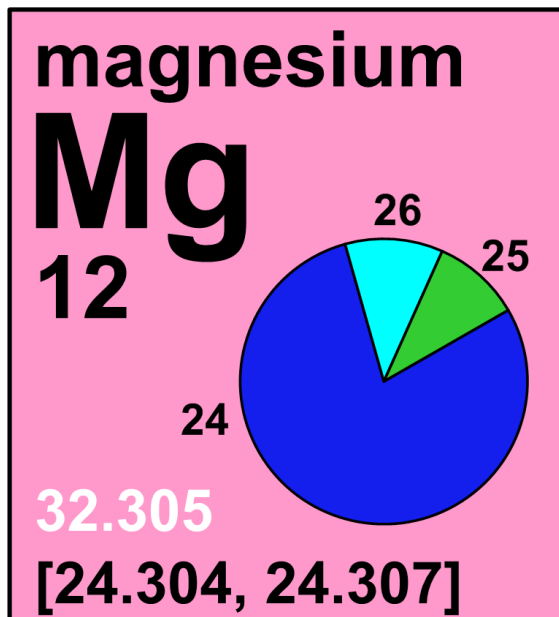




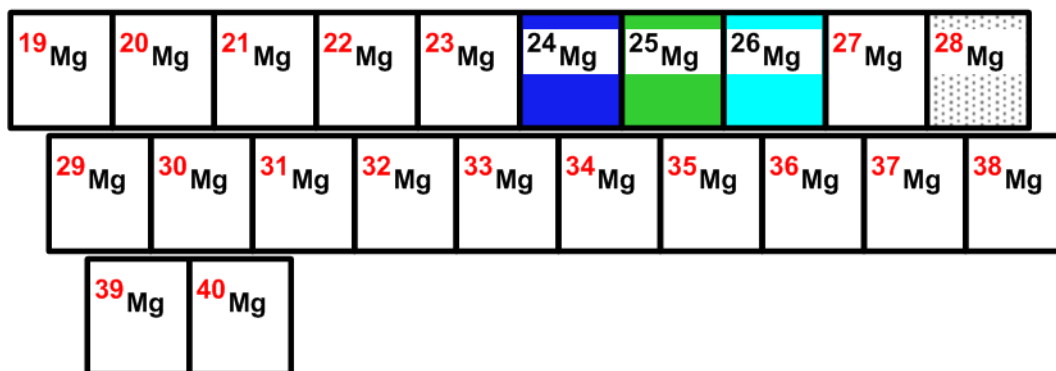
4.12 magnesium



Stable isotope	Relative atomic mass	Mole fraction
^{24}Mg	23.985 041 70	[0.7888, 0.7905]
^{25}Mg	24.985 8370	[0.099 88, 0.100 34]
^{26}Mg	25.982 5930	[0.1096, 0.1109]

Half-life of radioactive isotope

Less than 1 hour 
Between 1 hour and 1 year 



4.12.1 Magnesium isotopes in biology

Natural magnesium enriched in the **stable isotopes** ^{25}Mg and ^{26}Mg have been used as **tracers** in human studies to assess absorption, **excretion**, distribution, and utilization of magnesium in basic and applied research [105, 110, 111].

4.12.2 Magnesium isotopes in Earth/planetary science

Molecules, atoms, and ions of the stable **isotopes** of magnesium possess slightly different physical and chemical properties, and they commonly will be fractionated during physical, chemical, and biological processes, giving rise to variations in **isotopic abundances** and in

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atomic weights. There are substantial variations in the isotopic abundances of magnesium in natural terrestrial materials (Figure 4.12.1). These variations are useful in investigating the origin of substances and studying environmental, hydrological, and geological processes [10, 14, 112].

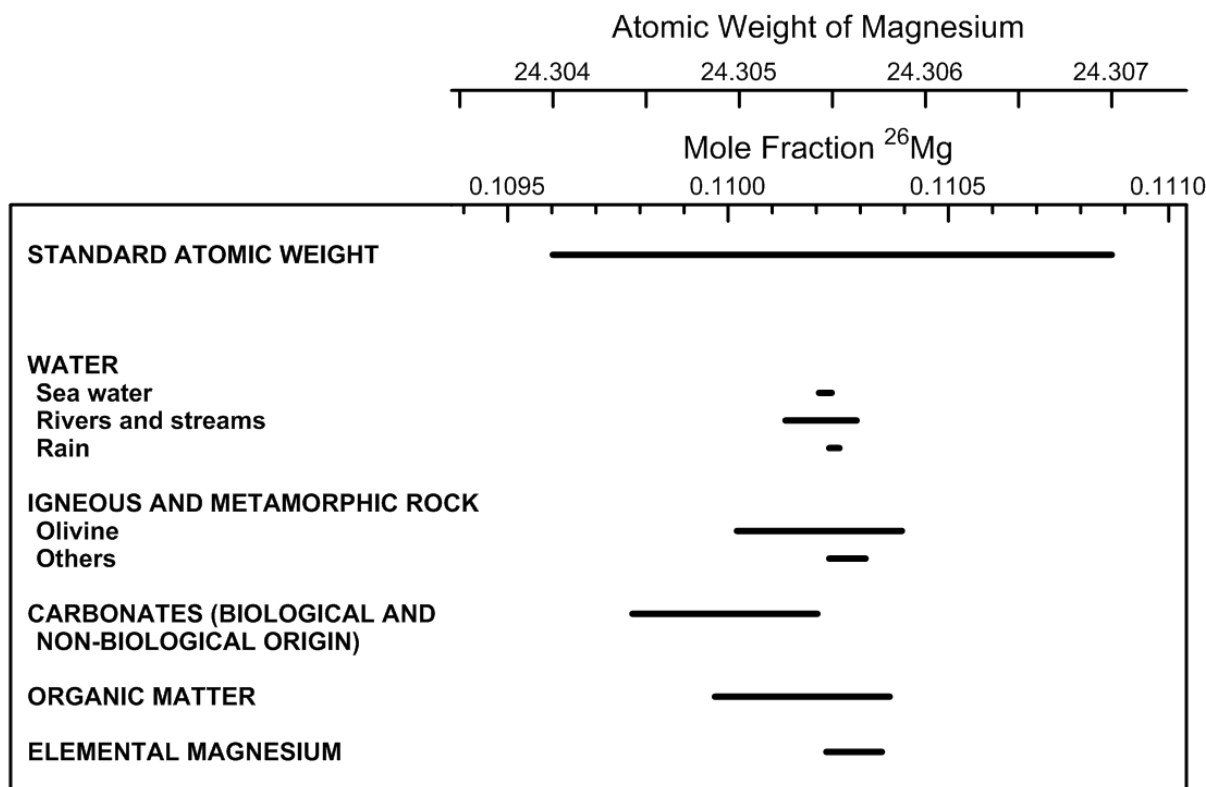


Fig. 4.12.1: Variation in **atomic weight** with **isotopic composition** of selected magnesium-bearing materials (modified from [10, 14]).

4.12.3 Magnesium isotopes in geochronology

^{26}Mg is a stable isotope and is the **radiogenic** product of ^{26}Al decay. ^{26}Al is produced by **cosmic rays** in space and in the atmosphere, and it was present in the **primordial solar nebula**. The anomalous abundance of ^{26}Mg in **meteorite** inclusions indicate that this material must have been formed early in the development of the Solar System before all primordial ^{26}Al (with **half-life** of 7.1×10^5 years) had decayed [113].