An interstitial compound or interstitial alloy is a compound that is formed when an atom of sufficiently small radius sits in an interstitial “hole” in a metal lattice. Examples of small atoms are hydrogen, boron, carbon and nitrogen. These compounds are important industrially, for example some transition metal carbides and nitrides.

![Figure 6.7B.1: Different atomic mechanisms of alloy formation, showing pure metal, substitutional, and interstitial structures. Image used with permission from Wikipedia.](image)

With the interstitial mechanism, one atom is usually much smaller than the other, so cannot successfully replace an atom in the crystals of the base metal. The smaller atoms become trapped in the spaces between the atoms in the crystal matrix, called the **interstices**. This is referred to as an **interstitial alloy**. Steel is an example of an interstitial alloy, because the very small carbon atoms fit into interstices of the iron matrix. Stainless steel is an example of a combination of interstitial and substitutional alloys, because the carbon atoms fit into the interstices, but some of the iron atoms are replaced with nickel and chromium atoms.