# Building scheme for AFN

1. Periodic Building Unit – 2. Connection mode – 3. Parallel projections of the unit cell
4. Channels and/or cages – 5. Supplementary information

## 1. Periodic Building Unit:

**AFN** can be built using T8-units composed of three fused 4-rings (or, alternatively, of a not fully connected double 4-ring; both units in bold in Figure 1). T8-units, related by a rotation of 180º about ***b***, are connected through (fused) 4-rings into chains along ***a***. The Periodic Building Unit (PerBU) is obtained when neighboring chains, related by pure translations along ***c***, are connected along ***c*** through single T-T bonds into the ***ac*** layer as depicted in Figure 1

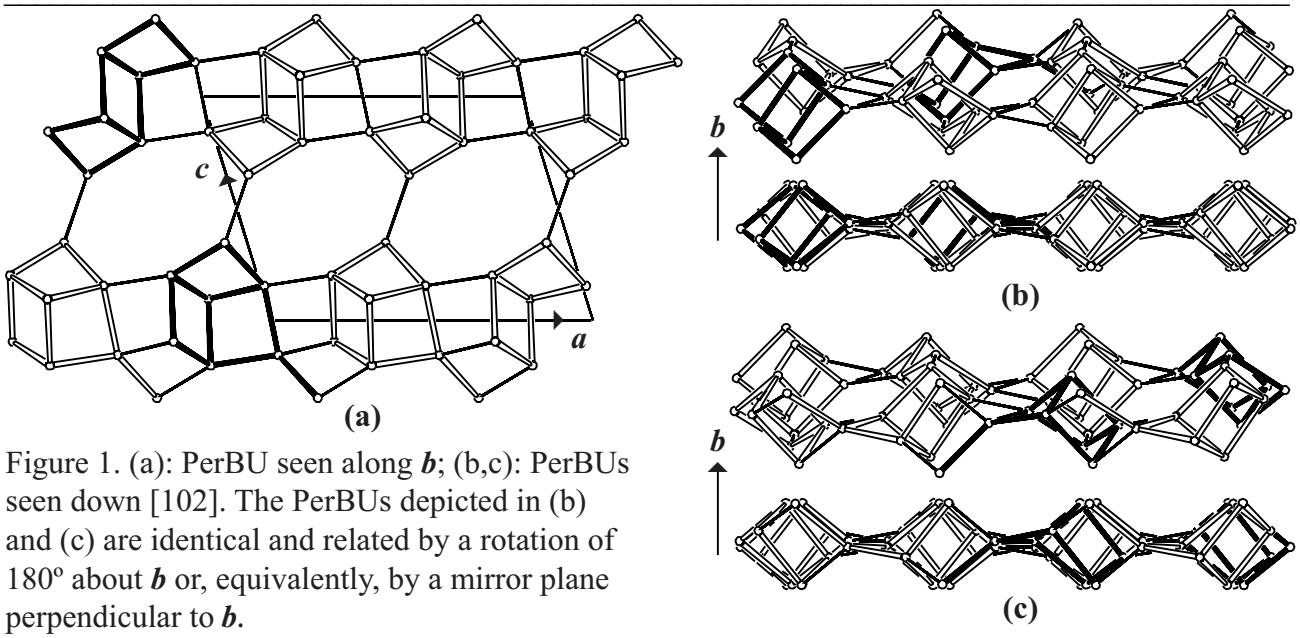



Figure 1. (a): PerBU seen along ***b***; (b,c): PerBUs seen down [102]. The PerBUs depicted in (b) and (c) are identical and related by a rotation of 180º about ***b*** or, equivalently, by a mirror plane perpendicular to ***b***.

## 2. Connection mode:

Neighboring PerBUs, related by a rotation of 180º about ***b***, are connected along ***b*** through (fused) 4- and 6-rings as shown in Figure 2. **AFN** can also be built from 8-rings that are formed.

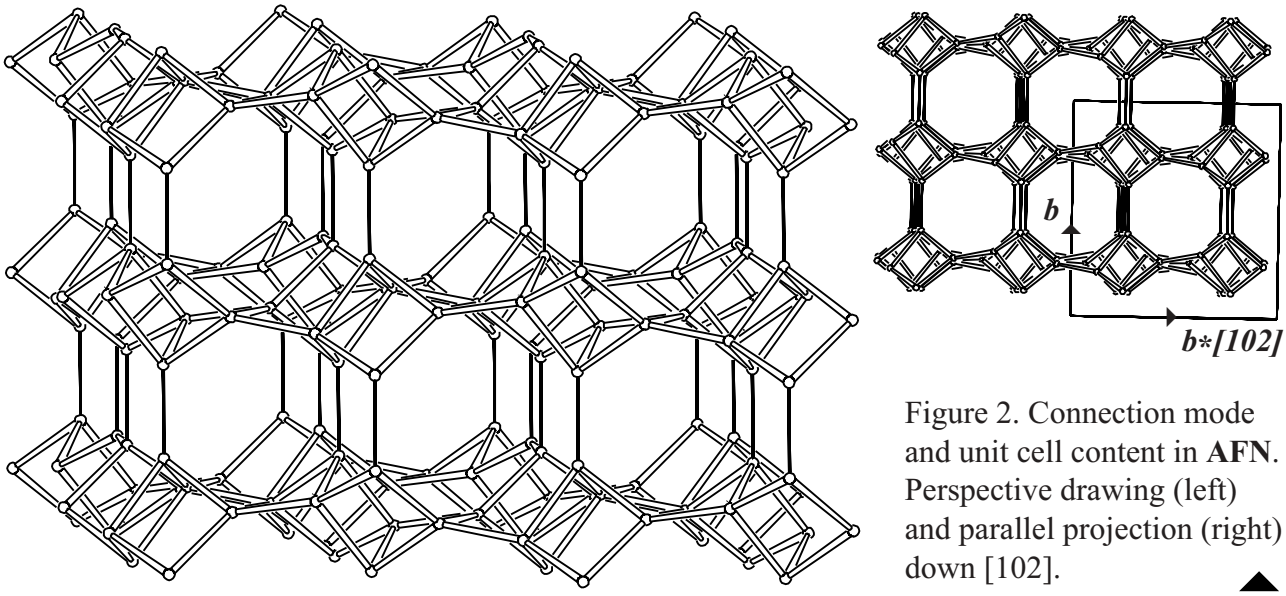


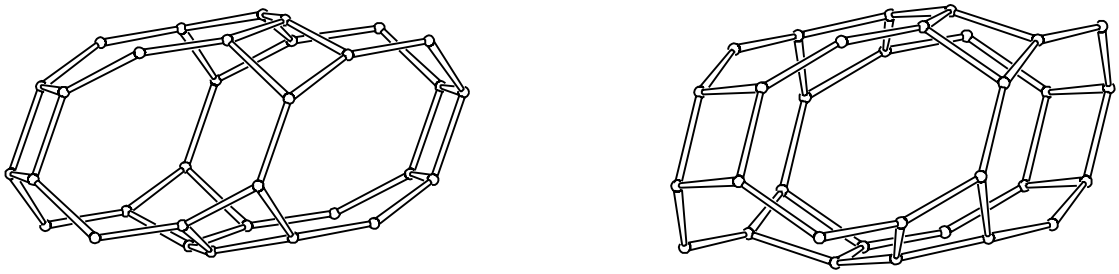

Figure 2. Connection mode and unit cell content in **AFN**. Perspective drawing (left) and parallel projection (right) down [102].

**3. Projections of the unit cell content:** See Figure 2.

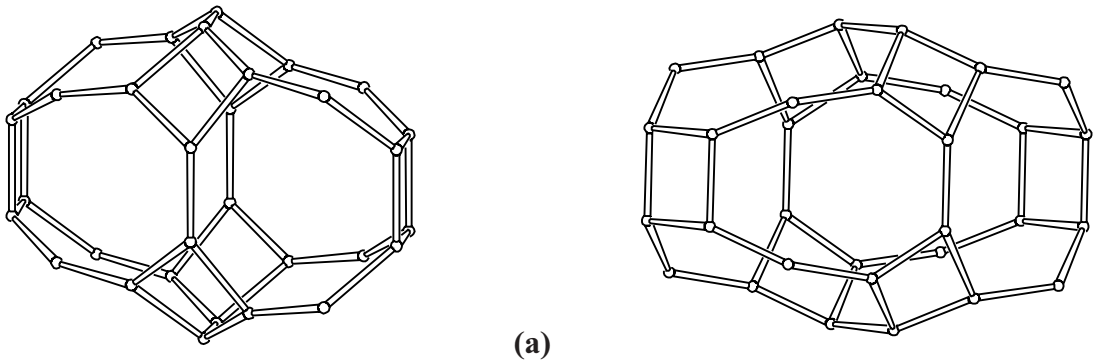
**4. Channels and/or cages:**

Large cavities (the channel intersections), related by 2-fold screw axes parallel to ***b*** and by pure translations along ***a*** and ***c***, are connected into 8-ring channels along [010], [102] and [110] (and [-110]) as illustrated in Figure 3. The **pore descriptor** is added.

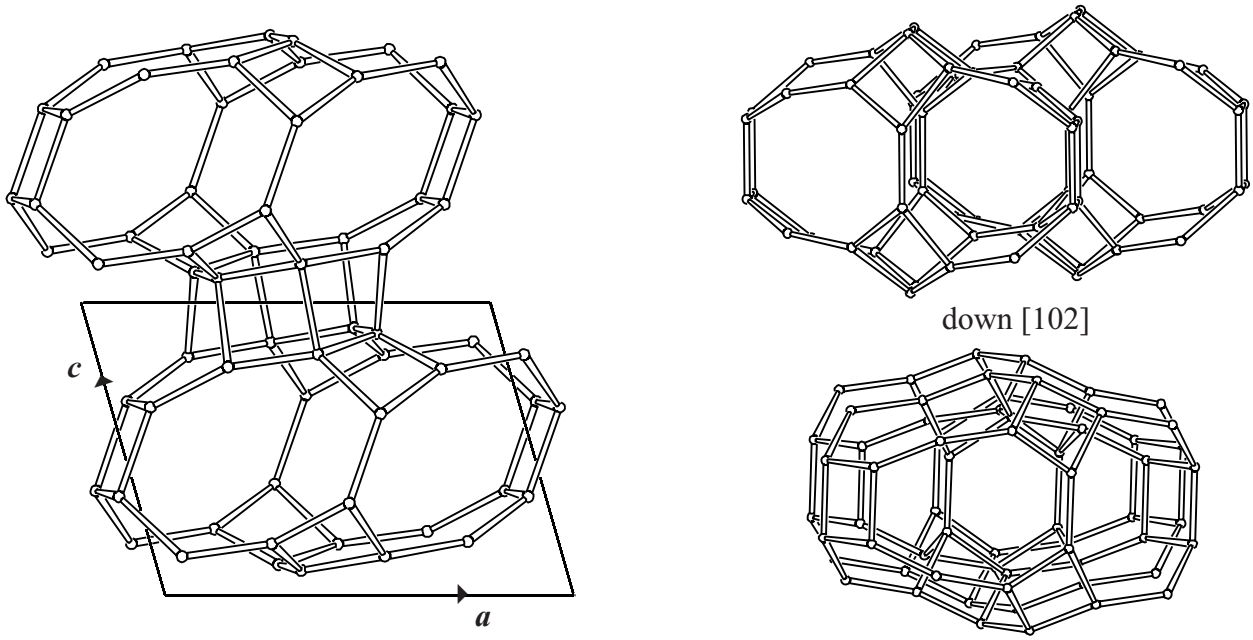
---



{3 [$4^6 8^8$] [010] (8-ring), [102] (8-ring) [110] (8-ring)}

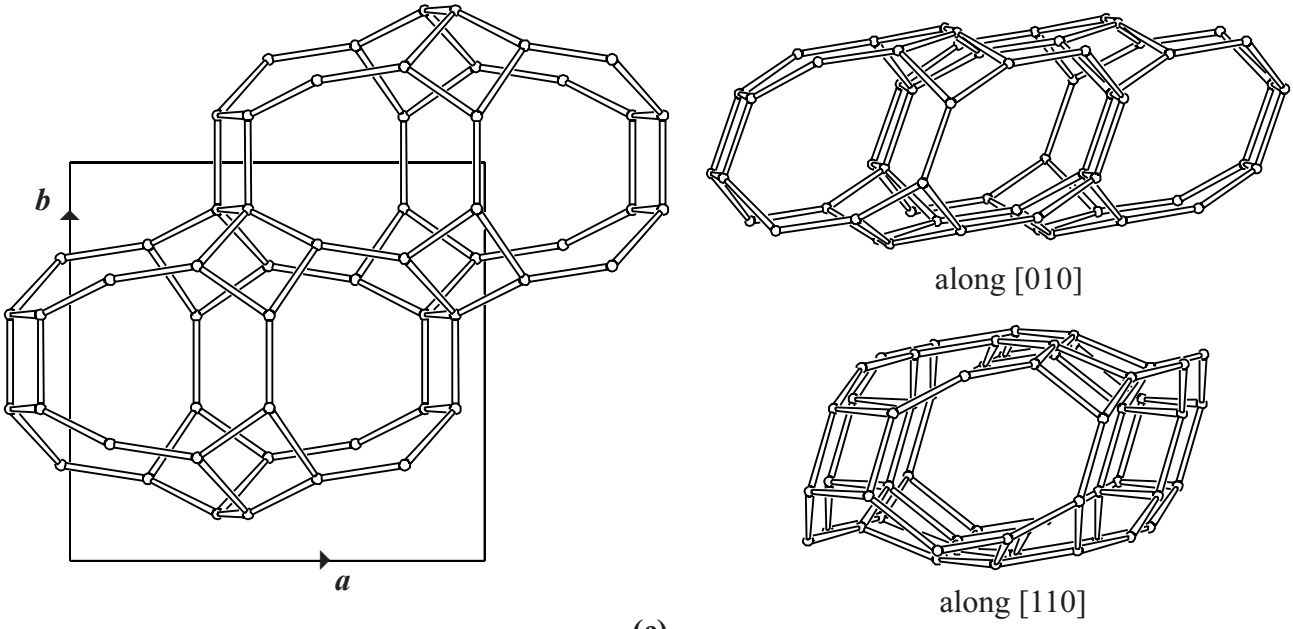


**(a)**




**(b)**

Figure 3. (a): Channel intersection in **AFN** in perspective view along [010] (top left), along [110] (top right), along [102] (bottom left) and along [001] (bottom right); (b): Connection of channel intersections parallel to [001] seen along [010] (left), along [102] (top right) and along [001] (bottom right); [Figure 3 is continued on next page].




**(c)**

Figure 3 [Cont'd]. (c): Connection of channel intersections parallel to [110] seen perpendicular to the ***ab*** plane (left), along [010] (top right) and along [110] (bottom right).

---

**5. Supplementary information:**

***Other framework types containing (modified) double 4-rings (D4Rs)***
Double 4-rings (D4Rs) can be connected in several other ways. In some cases the 4-rings of the D4Rs are not 4-fold connected and/or additional T atoms are needed to build the framework.
In the **INTRO** pages links are given to a detailed description of a sub-set of framework types that contain (modified) D4Rs (choose: **Double 4-rings**). There is also a link provided to a summary of the PerBUs used in the building schemes of these framework types (choose: **Appendix**; **Figure 5**).