Building scheme for ISV and BEC

1. Periodic Building Unit:

Tetragonal **ISV** and **BEC** can be built using T16-units: four fused 6-rings or eight fused 5-rings (one in bold in Figure 1). T16-units, related by pure translations along **x**, are connected into chains parallel to **x**. Neighboring chains, related by a rotation of 180º about the chain axis, are connected along **y** through 4-rings into the Periodic Building Unit (PerBU) depicted in Figure 2. [Compare this PerBU with those in the **Beta-like framework types**; for a different PerBU in **BEC**: see **Alternative description**; for the PerBU in **ISV** and **BEC** built from 6-2 units: see **Figure 7**]
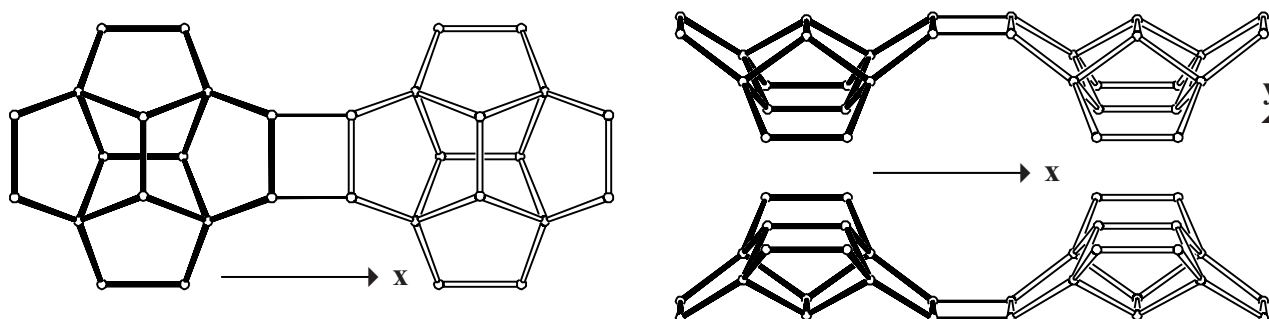
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Figure 1. T16 units, related by pure translations along **x** are connected into chains along **x**. Chain viewed along **y** (left), and along **z** (right). The chains on the right differ by a rotation of 180º about **x**.
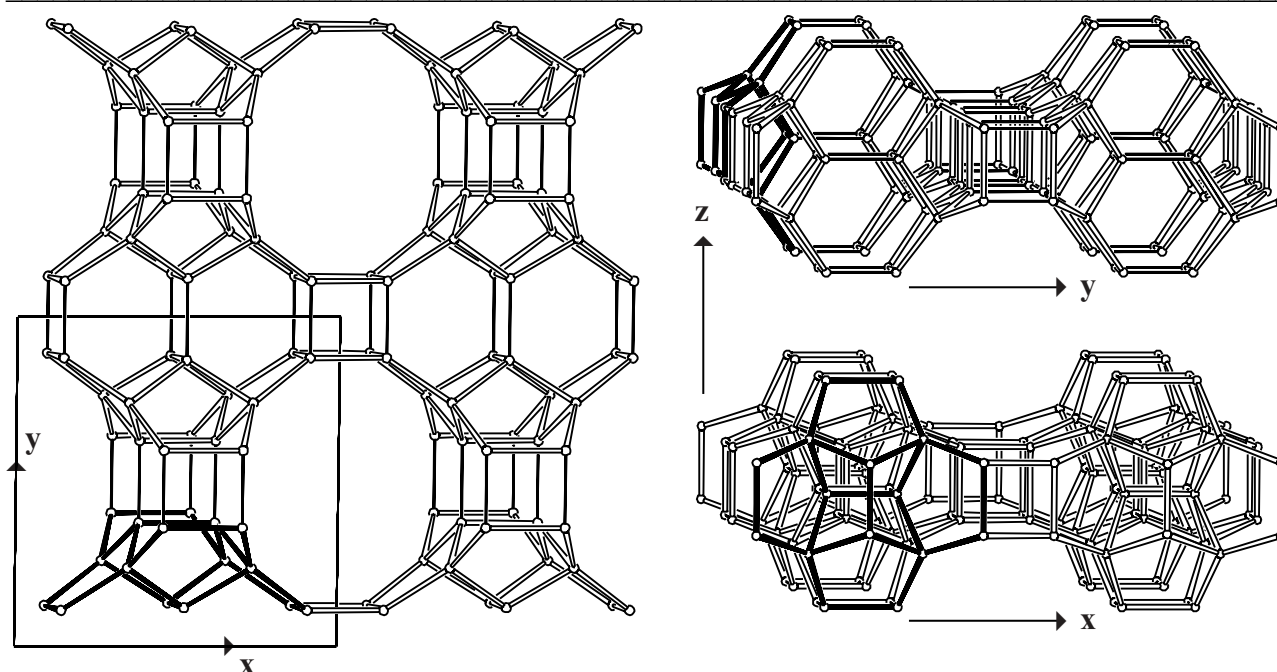
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Figure 2. PerBU viewed along the plane normal **z** (left), down **x** (top right), and along **y** (bottom right). The PerBU's, depicted at the right, are identical and related by a rotation of 90º about **z**.

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2. Connection mode:

Neighboring PerBUs are connected along **z** in two different ways:

(1): neighboring PerBUs, related by pure translations along **z**, are connected through double 4-rings. The connectivity exhibits mirror symmetry between successive layers.

(2): neighboring PerBUs, related by a rotation of 90º about **z**, are connected through double 4-rings. Successive layers are related by a **4₂** axis.
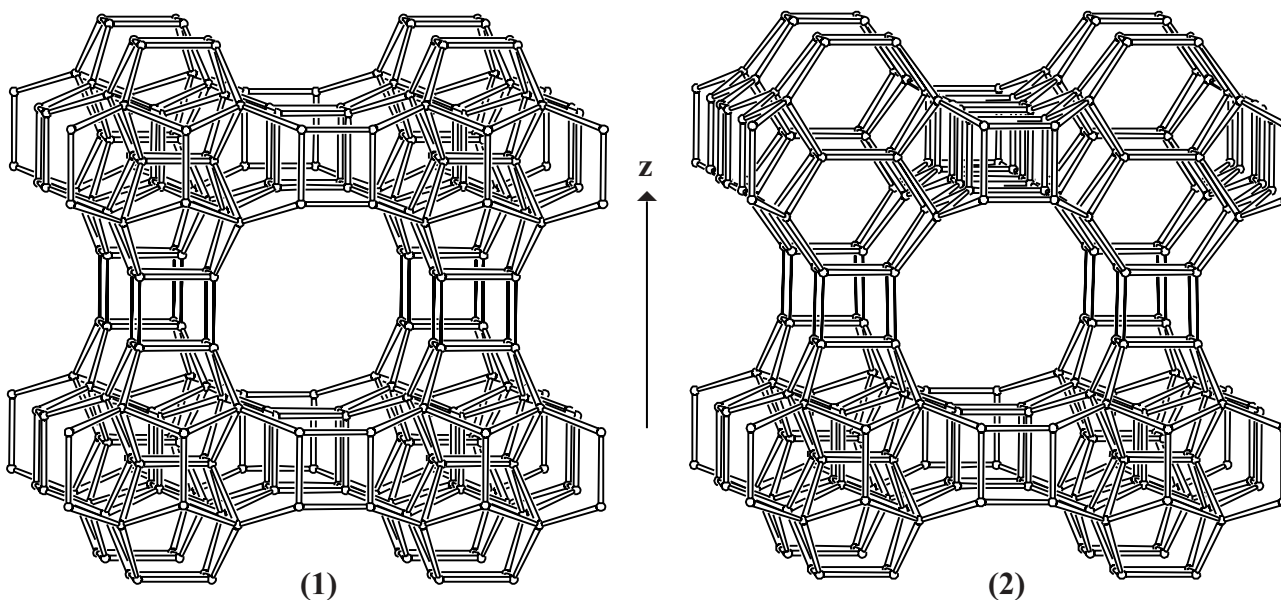

(1)   **(2)**

Figure 3. Connection mode **(1)** in **BEC** (left) and connection mode **(2)** in **ISV** (right) viewed along **y**.

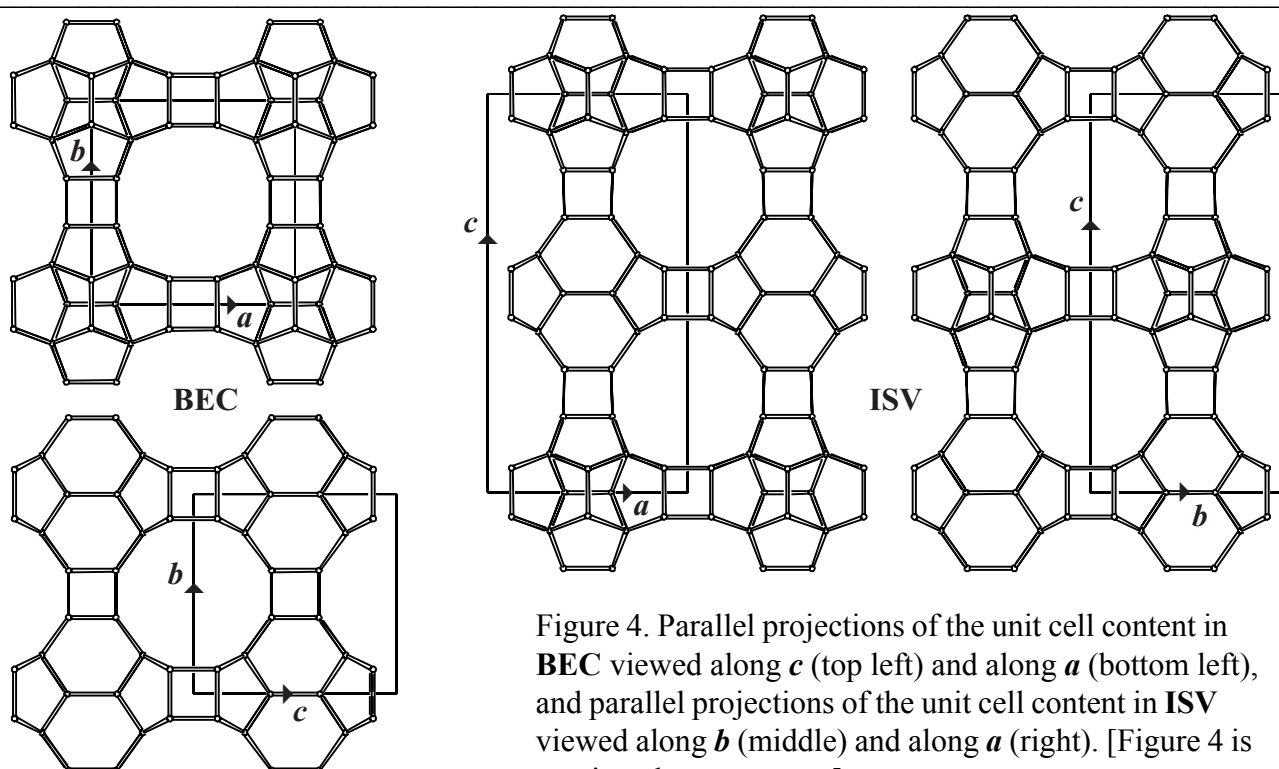## 3. Projections of the unit cell content: see Figure 4

BEC

ISV

Figure 4. Parallel projections of the unit cell content in **BEC** viewed along **c** (top left) and along **a** (bottom left), and parallel projections of the unit cell content in **ISV** viewed along **b** (middle) and along **a** (right). [Figure 4 is continued on next page]
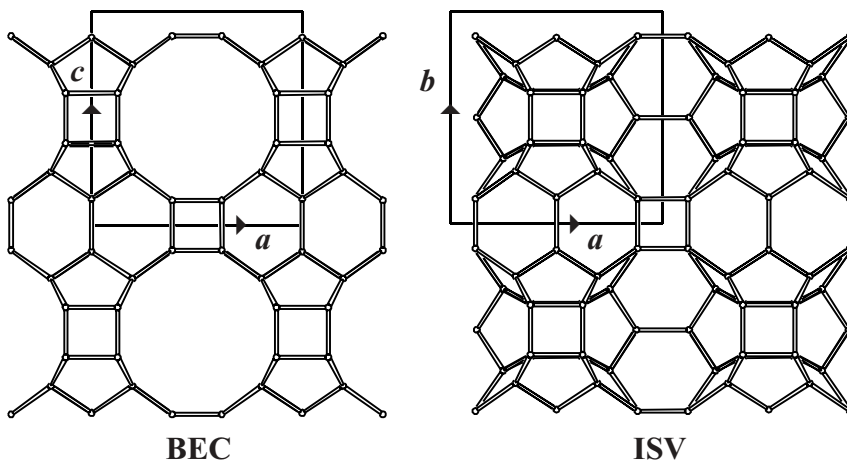
Figure 4 [Cont'd]. Parallel projections of the unit cell content in **BEC** and in **ISV** viewed along **b** (left), along **c** (right).

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4. Channels and/or cages:

The pore system in **ISV** can be described using "double" cavities depicted in Figure 5 together with the **pore descriptor**. Fused cavities form 12-ring channels parallel to <100> and to [001] as shown in Figure 6. Diffusion through the 12-ring channel in **ISV** parallel to [001] is obstructed as can be seen from Figures 4, 5 and 6. For a description of the channels in **BEC**: see **BEC**.

{1 [$4^2 5^4 6^4 12^2$] [001] (12-ring)
 / 2 [$4^4 5^2 6^2 12^3 12^{2/2}$] <100> (12-ring),
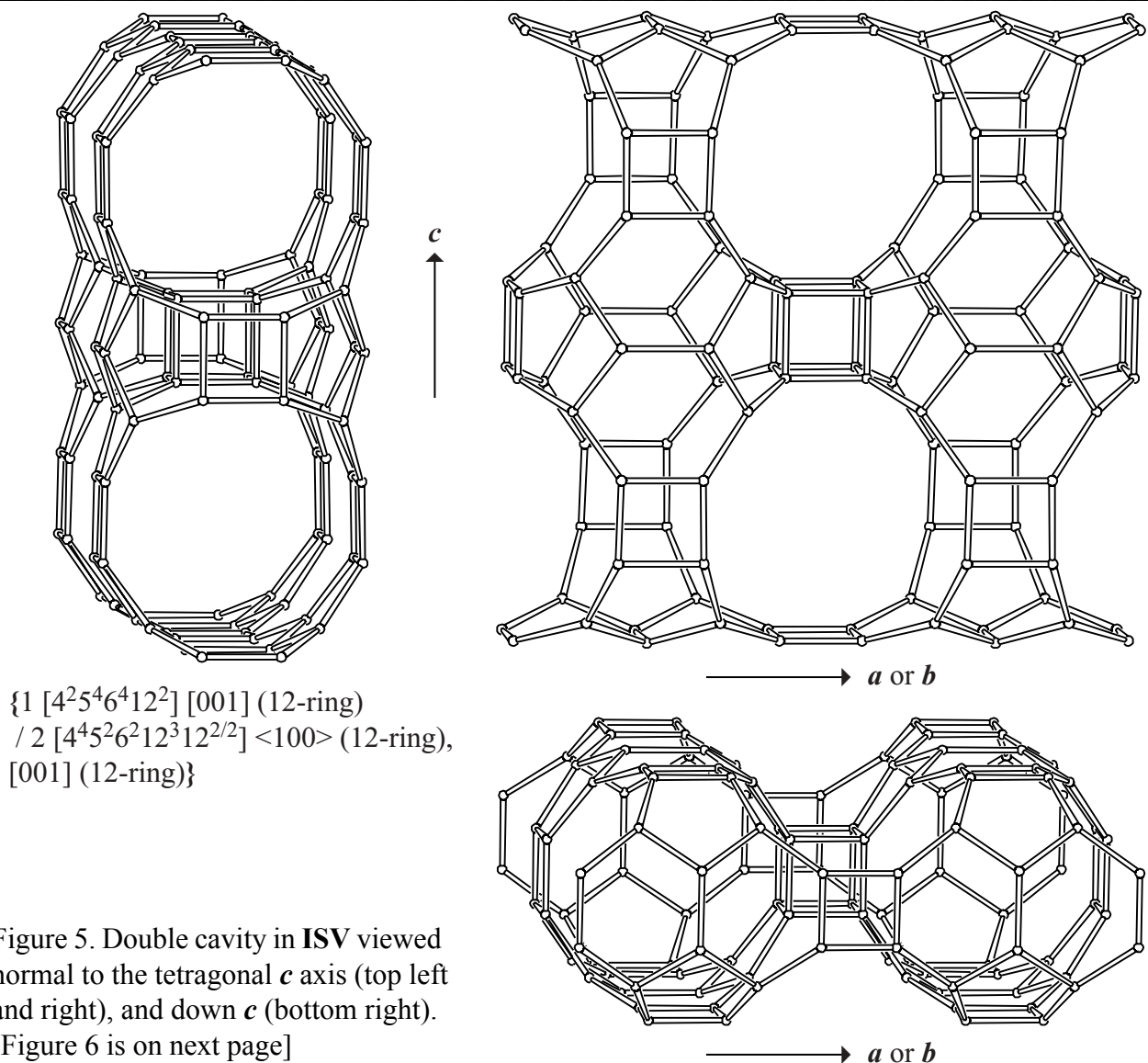[001] (12-ring)}

Figure 5. Double cavity in **ISV** viewed normal to the tetragonal **c** axis (top left and right), and down **c** (bottom right). [Figure 6 is on next page]
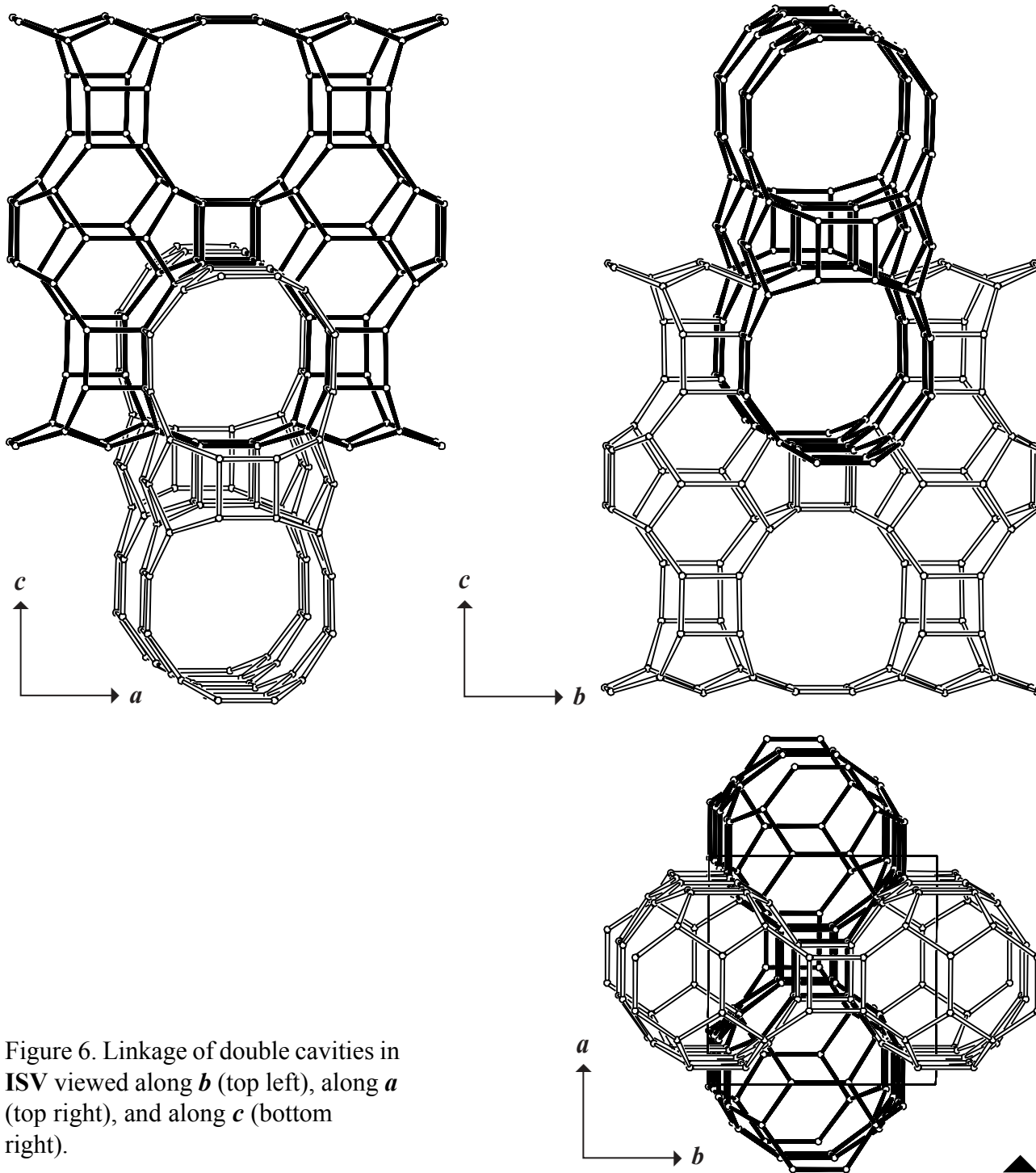
Figure 6. Linkage of double cavities in **ISV** viewed along **b** (top left), along **a** (top right), and along **c** (bottom right).

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5. Supplementary information:

Alternative description of **BEC**
An alternative description of **BEC** using a different PerBU is presented in the building scheme of **BEC**.

Beta-like framework types
Beta-like framework types can be constructed using chains that resemble the chain in the **BEA** framework type.

In the **INTRO**-pages links are given to a description of the framework types that contain these chains (choose: **Beta-family**). There is also a link provided to a summary of the chains and PerBUs used in the building schemes of the framework types (choose: **Appendix**; **Figure 9**). ▲
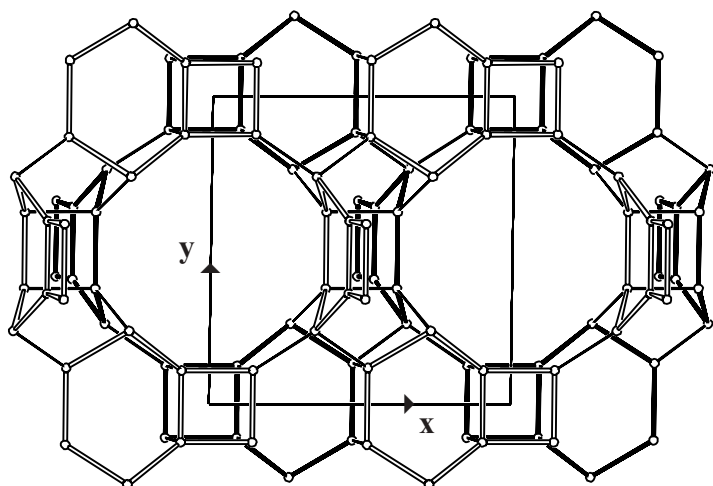
Figure 7.

Figure 7. PerBU built from 6-2 units. The 6-2 units farthest from the reader are in bold.