# The BEC/ISV family



**1. The Periodic Building Unit (PerBU)** equals the **xy** layer shown in Figure 1. This layer is built from chains composed of T16 units shown in Figure 2.

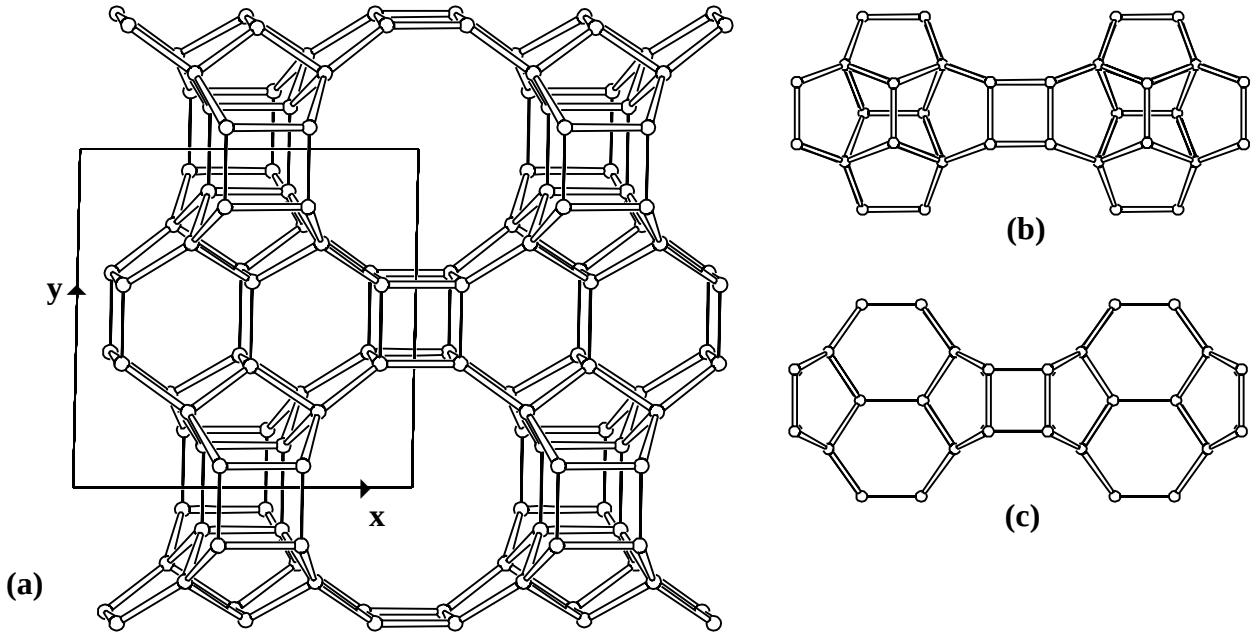


Figure 1: PerBU of the BEC/ISV family of zeolite frameworks shown in perspective view along the plane normal **z** (a) and in projection parallel to **y** (b) and parallel to **x** (c). The PerBU's, depicted in (b) and (c), are identical and related by a rotation of 90º about **z**

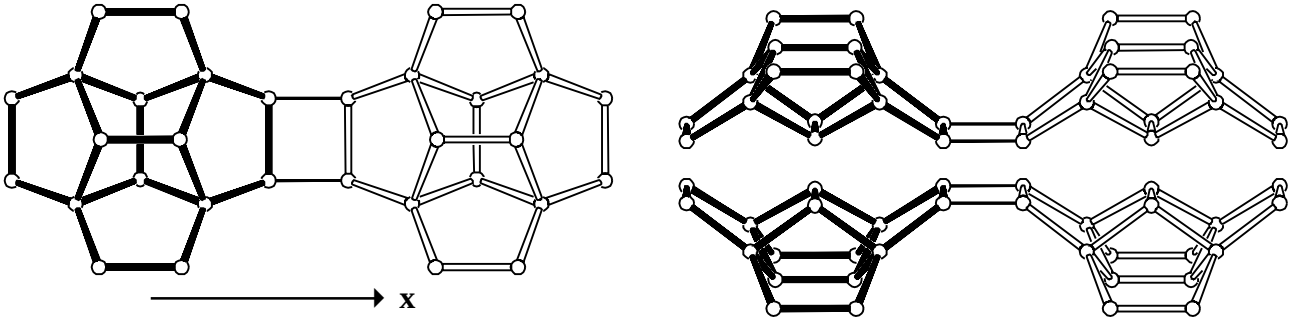


Figure 2: T16 units, related by pure translations along **x** are connected into chains along **x**. Chain seen along **y** (left) and along **z** (right). The chains on the right differ by a rotation of 180º about **x**

The PerBU of the BEC/ISV family is composed of chains of T16 units (bold in Fig.2). Neighbouring chains, related by a rotation of 180º about the chain axis, accompanied by a zero lateral shift along **x** (or by a mirror plane perpendicular to **y**), are connected along **y** through T4-rings as shown in Figure 1. [Compare this connection with the different connection of T16 chains in the Beta family]

**2. Type of Faulting:** 1-dimensional stacking disorder of the PerBU's along **z**.

**3. The Layer Symmetry:** the plane space group of the PerBU is P 2/m 2/m (2/m).

**4. Connectivity Pattern of the PerBU:**

Neighbouring PerBU's are connected along **z** in two different ways:
**(a)**: neighbouring PerBU's are related by a pure translation along **z**. The connectivity exhibits mirror symmetry between successive layers (double T4-rings are formed).
**(b)**: neighbouring PerBU's are related by a rotation of 90º about **z**. Successive layers are related by a $4_2$ axis (double T4-rings are formed).

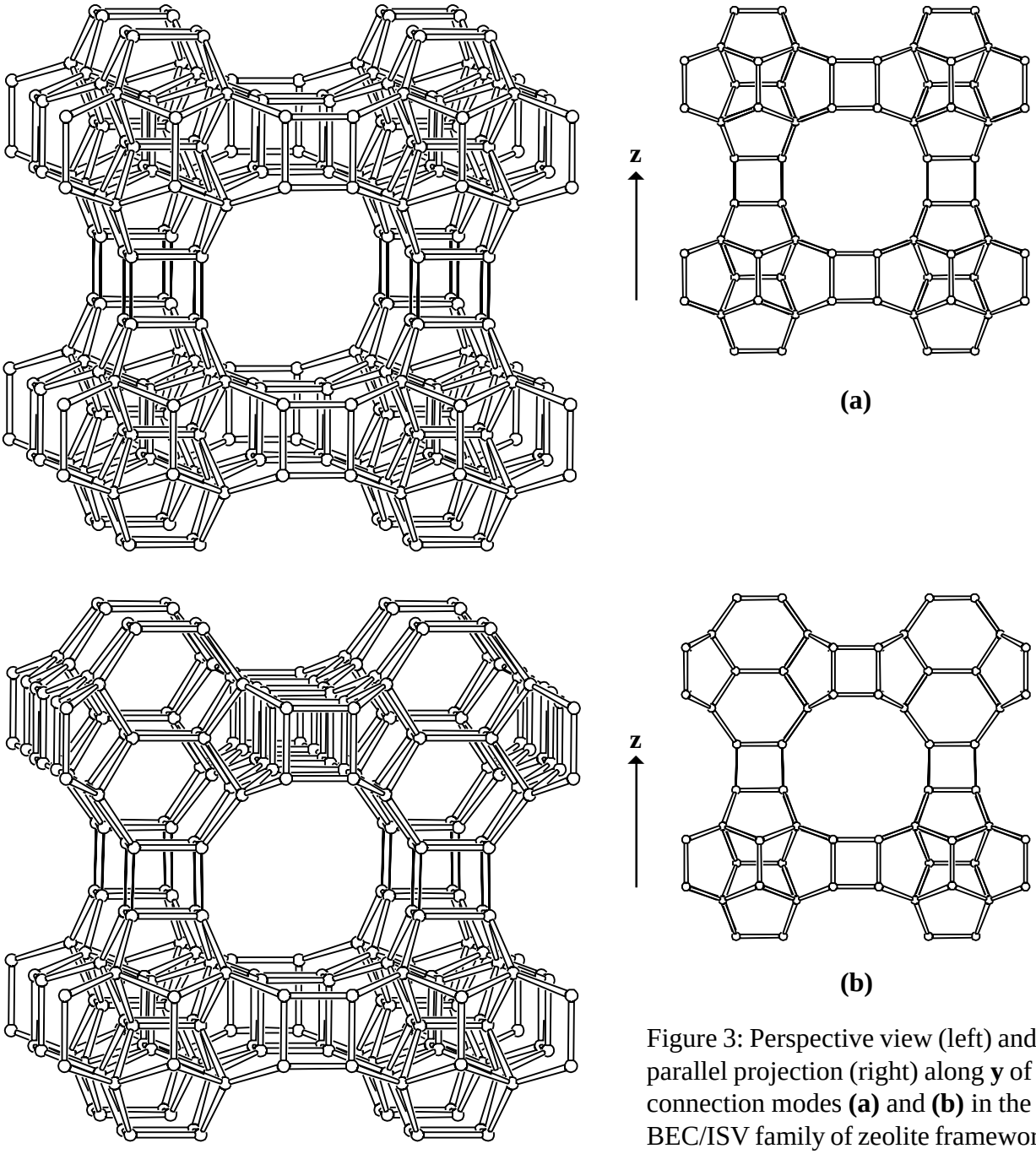


Figure 3: Perspective view (left) and parallel projection (right) along **y** of the connection modes **(a)** and **(b)** in the BEC/ISV family of zeolite frameworks

Once the distribution of the symmetry elements **m** and $4_2$ between the layers stacked along **z** is known, the 3-dimensional stucture is defined.

**5. The Simplest Ordered End-Members** in the BEC/ISV family are shown in Figure 4:

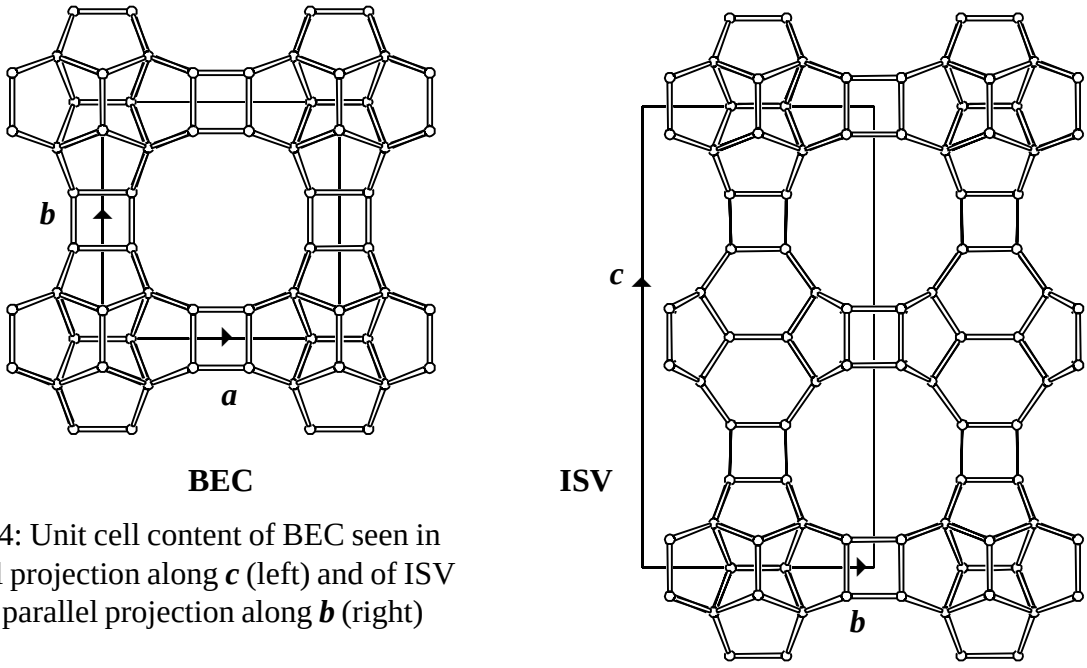


Figure 4: Unit cell content of BEC seen in parallel projection along ***c*** (left) and of ISV seen in parallel projection along ***b*** (right)

Pure BEC(1) and ISV(2) are obtained when neighbouring PerBU's, stacked along the plane normal of the PerBU, are exclusively related by **m** and $\mathbf{4_2}$, respectively.

**6. Disordered Materials Synthesized and Characterized to Date:**

No disordered materials known to date.

**7. Supplementary Information**

**7.1** ***Comparison with the BETA family:***

The PerBU in the Beta family is the tetragonal ***ab*** layer depicted in Figure 5. The layer is composed of T16 units (in bold) related by pure translations along ***a*** and ***b***.

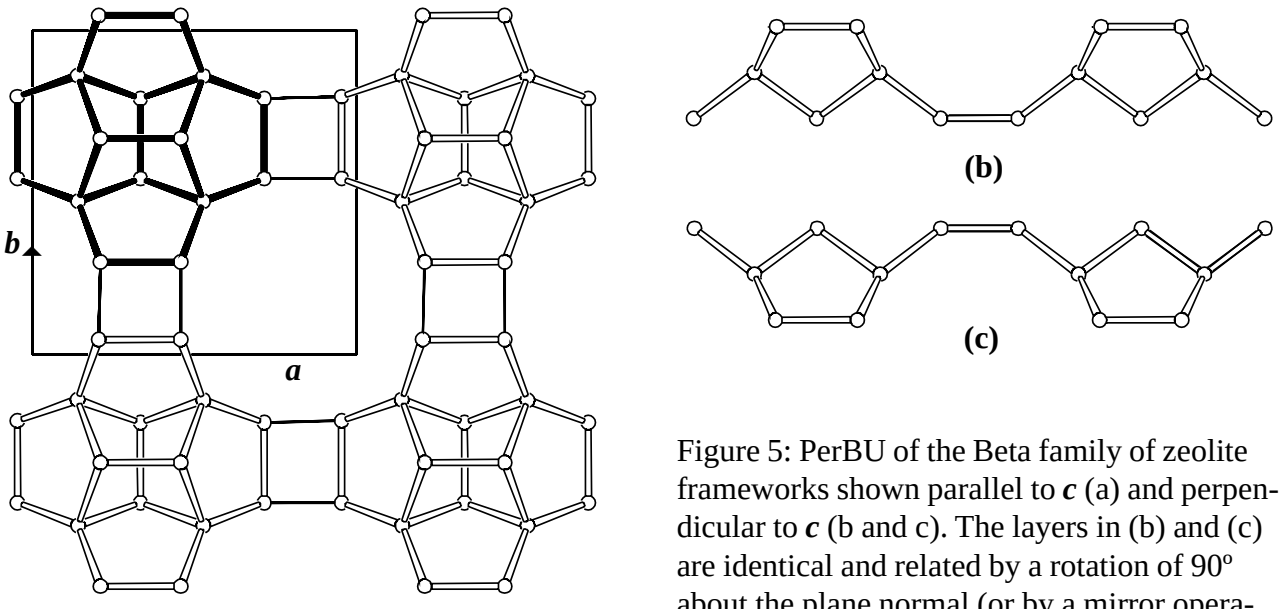


Figure 5: PerBU of the Beta family of zeolite frameworks shown parallel to ***c*** (a) and perpendicular to ***c*** (b and c). The layers in (b) and (c) are identical and related by a rotation of 90º about the plane normal (or by a mirror operation perpendicular to the plane normal)

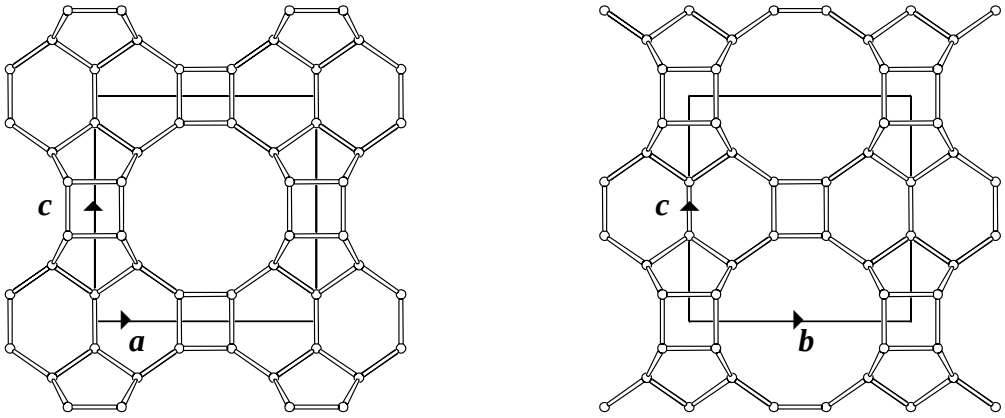


Figure 6: Unit cell content of the end-member BEC seen along ***b*** (left) and along ***a*** (right)

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For more details: see the description of the Beta family in this 'Catalog'.

**8. References**

(1) L.A. Villaescusa, P.A. Barrett and M.A. Camblor, Angew. Chem., Int. Ed. **38**, 1997 (1999).

(2) T. Conradsson, M.S. Dadachov and X.D. Zou , Microp. and Mesop. Mat., **41**, 183 (2000).