

# The Fibrous Zeolite Family

1. The Periodic Building Unit (PerBU) - 2. Type of Faulting - 3. The Rod Symmetry  
 4. Connectivity Pattern - 5. Ordered End-Members - 6. Disordered Materials synthesized to date  
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1. **The Periodic Building Unit (PerBU)** is the fibrous chain axis  $c$  shown in Figure 1:

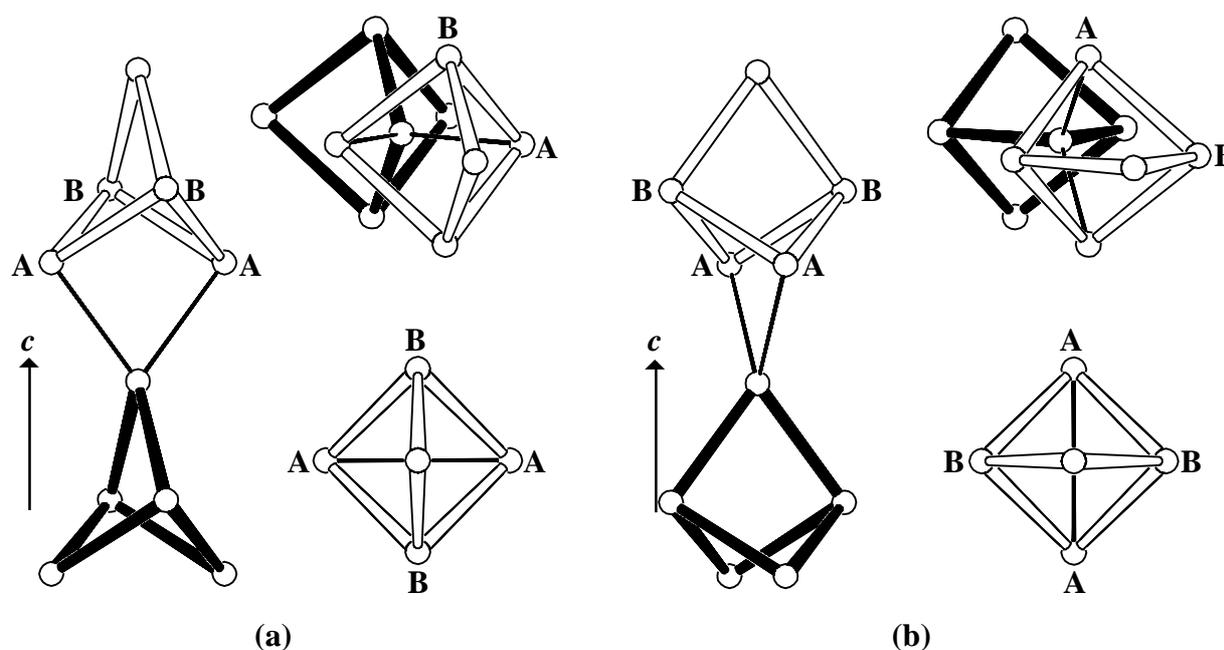


Figure 1(a): Perspective view of the PerBU seen perpendicular to the chain axis  $c$  (left) and down  $c$  in perspective view (top right) and in parallel projection (bottom right); (b): as (a) after a rotation of  $90^\circ$  about the chain axis has been applied

The PerBU in the fibrous zeolite family of framework types is formed by connecting T5 units ('capped' T4-rings; depicted in Fig. 1 in bold) related by pure translations along  $c$ . The T atoms labeled A and B are indicators for the 'height' above the [001] plane (the 'height' difference is  $\frac{1}{4}c$ ) and are used in the description of the connection modes.

**2. Type of faulting:** 2-dimensional stacking disorder of the PerBU's along [100] and [010].

**3. The rod symmetry** of the PerBU is  $\bar{4}$  (m) 2. ▲

#### 4. Connectivity pattern of the PerBU:

Neighbouring PerBU's can be connected in the *ab* plane via O-bridges in several ways:

- neighbouring chains are related by pure translations. The resulting connection modes are denoted as A-A and B-B.
- neighbouring chains are related by a 90° rotation about the chain axis followed by a translation of minus or plus  $\frac{1}{4}c$ . The resulting connection modes are denoted as A-B or B-A

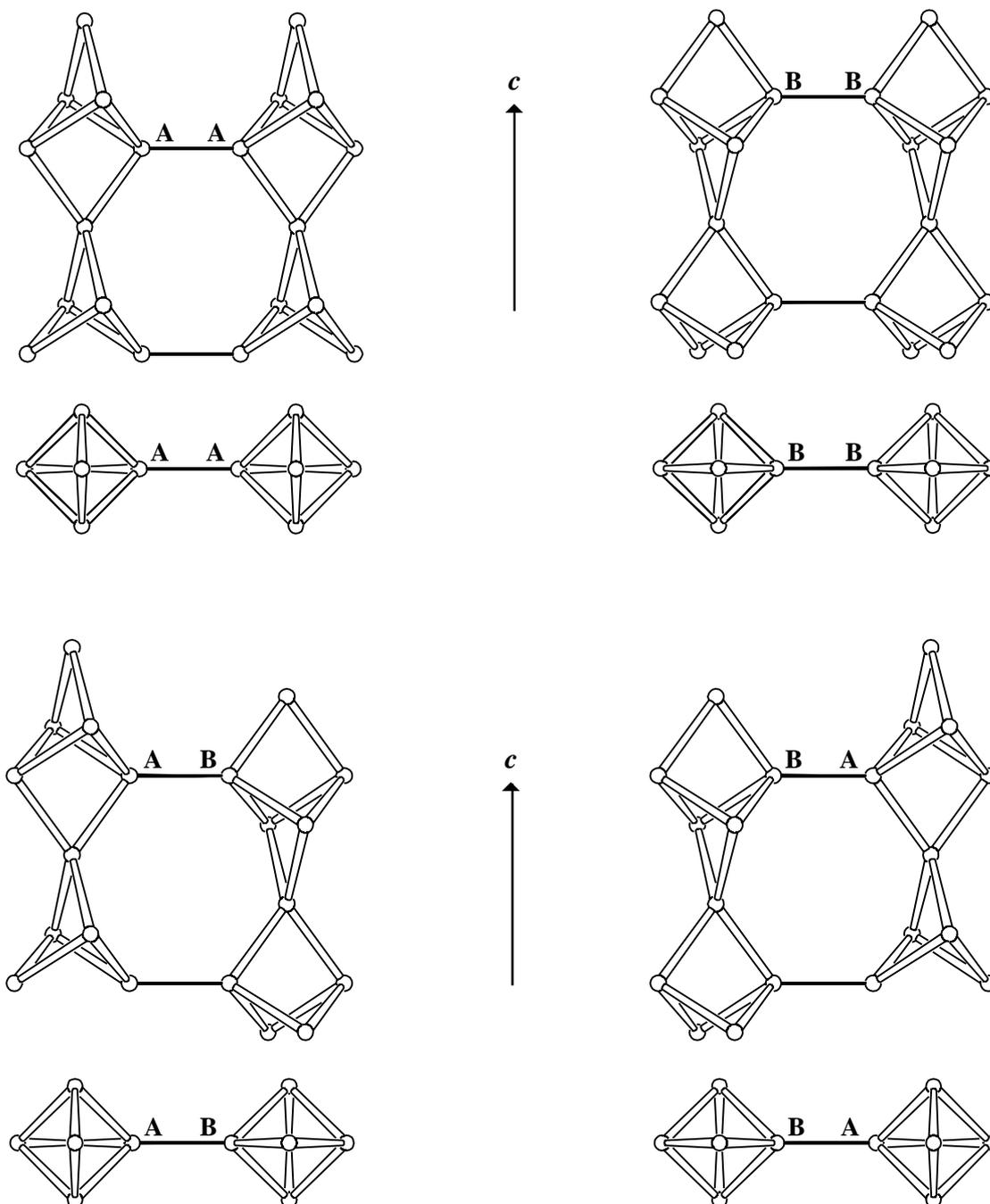


Figure 2: Perspective view perpendicular to the fibrous chain axis (top) and parallel projection along the chain axis (bottom) of the connection modes A-A, B-B, A-B and B-A in the fibrous zeolites

Once the distribution of the connection modes within the *ab* plane is known the 3-dimensional framework is defined. ▲

5. The simplest ordered end-members in the fibrous zeolite family are shown in Figure 3.

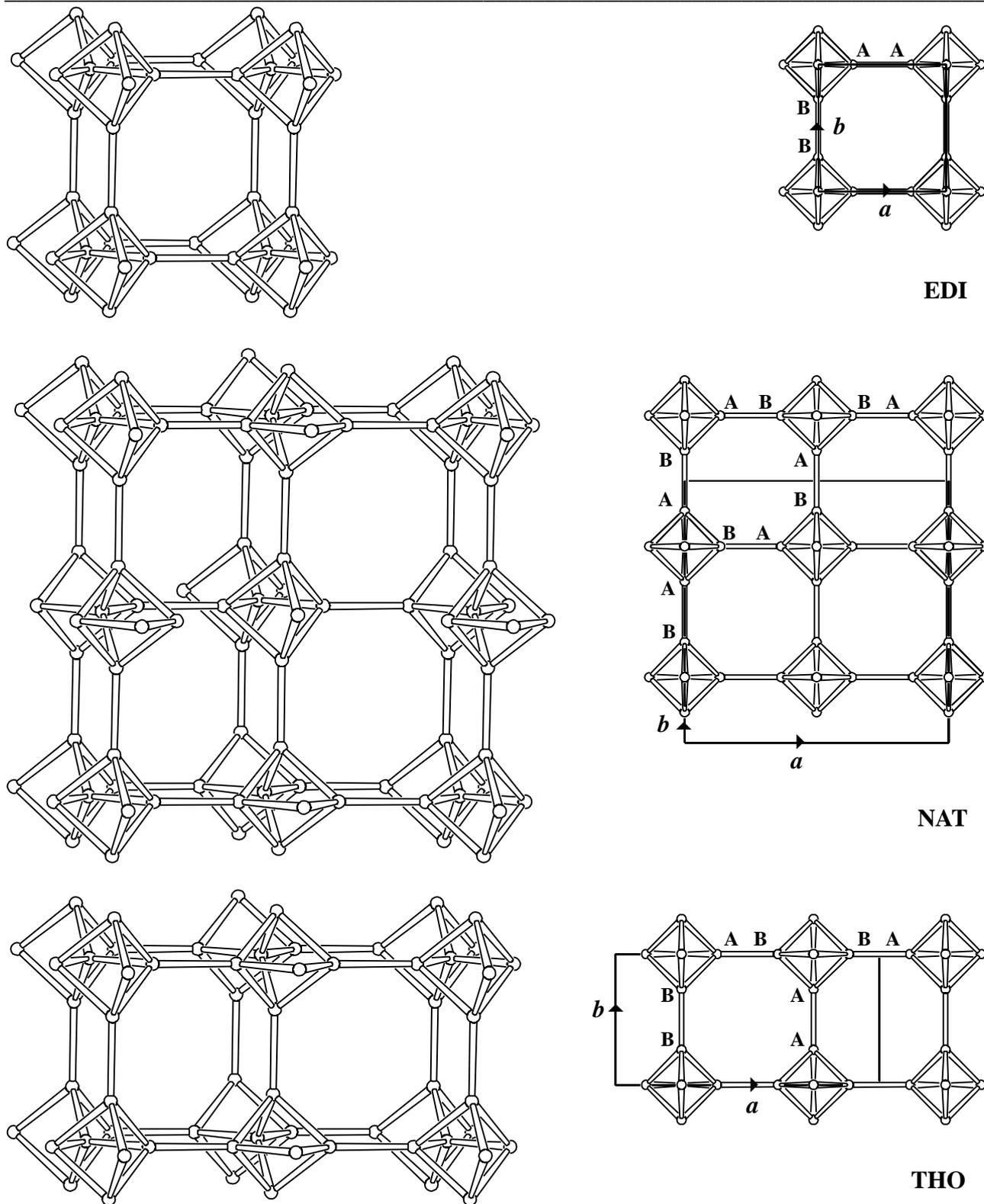


Figure 3: Perspective view (left) and parallel projection (right) along the fibrous chain axis  $c$  of the unit cell content of the three simplest ordered end-members in the fibrous zeolite family

Pure EDI(1-3), NAT(4,5) and THO(6-8) are obtained when neighbouring PBU's in the  $ab$  plane are exclusively related by translation (EDI), by a rotation of  $90^\circ$  about the chain axis (followed by a shift of  $\pm\frac{1}{4}c$ ) (NAT) and by rotation of  $90^\circ$  about the chain axis along  $a$  and translation along  $b$  (THO), respectively. ▲

## 6. Disordered materials synthesized and characterized to date:

to be added

## 7. Supplementary material

to be added



## 8. References

- (1) W.H. Taylor and R. Jackson, *Z. Kristallogr.* **86**, 53 (1933).
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