

SG No. 86  $C_{4h}^4$   $P4_2/n$  [ tetragonal ]

\* generator :  $\{2_{001}| \frac{1}{2} \frac{1}{2} 0\}$ ,  $\{4_{001}^+| 0 \frac{1}{2} \frac{1}{2}\}$ ,  $\{-1| 0\}$

\* symmetry operation + [0, 0, 0]

Table 1: Symmetry operations for 3d polar vector.

| No. | tag   | matrix (polar)  | det |
|-----|---|---|-----|
| 1   | $\{1  0\}$                                  | $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$                       | 1   |
| 2   | $\{2_{001}  \frac{1}{2} \frac{1}{2} 0\}$    | $\begin{bmatrix} -1 & 0 & 0 & \frac{1}{2} \\ 0 & -1 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & 0 \end{bmatrix}$ | 1   |
| 3   | $\{4_{001}^+  0 \frac{1}{2} \frac{1}{2}\}$  | $\begin{bmatrix} 0 & -1 & 0 & 0 \\ 1 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$  | 1   |
| 4   | $\{4_{001}^-  \frac{1}{2} 0 \frac{1}{2}\}$  | $\begin{bmatrix} 0 & 1 & 0 & \frac{1}{2} \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & \frac{1}{2} \end{bmatrix}$  | 1   |
| 5   | $\{-1  0\}$                                 | $\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$                    | -1  |
| 6   | $\{m_{001}  \frac{1}{2} \frac{1}{2} 0\}$    | $\begin{bmatrix} 1 & 0 & 0 & \frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{2} \\ 0 & 0 & -1 & 0 \end{bmatrix}$  | -1  |
| 7   | $\{-4_{001}^+  0 \frac{1}{2} \frac{1}{2}\}$ | $\begin{bmatrix} 0 & 1 & 0 & 0 \\ -1 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & -1 & \frac{1}{2} \end{bmatrix}$ | -1  |
| 8   | $\{-4_{001}^-  \frac{1}{2} 0 \frac{1}{2}\}$ | $\begin{bmatrix} 0 & -1 & 0 & \frac{1}{2} \\ 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & \frac{1}{2} \end{bmatrix}$ | -1  |