

MPG No. 33.4.134 $\bar{4}'2m'$ (-4'm'2 setting) [Type III, tetragonal] [T tensor]

* Rank 0 tensor. * Rank 1 tensor. * Rank 2 tensor (s).

$$\begin{bmatrix} 0 & T_{xy} & 0 \\ T_{xy} & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$T_{xy} = T_{dxy}^{(1)}$$

* Rank 2 tensor (a). * Rank 3 tensor (s).

$$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ T_{yzx} & 0 & 0 \\ 0 & -T_{yzx} & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$T_{yzx} = -3M_{du}^{(1)}$$

* Rank 3 tensor (a).

$$\begin{bmatrix} T_{yzx} & 0 & 0 \\ 0 & T_{yzx} & 0 \\ 0 & 0 & T_{xyz} \end{bmatrix}$$

$$T_{yzx} = -M_{du}^{(2)} + M_s^{(1)}$$

$$T_{xyz} = 2M_{du}^{(2)} + M_s^{(1)}$$

* Rank 4 tensor (sss).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & T_{xxxx} \\ 0 & 0 & 0 & 0 & 0 & T_{xxxx} \\ 0 & 0 & 0 & 0 & 0 & T_{zzxy} \\ 0 & 0 & 0 & 0 & T_{yzzx} & 0 \\ 0 & 0 & 0 & T_{yzzx} & 0 & 0 \\ T_{xxxx} & T_{xxxx} & T_{zzxy} & 0 & 0 & 0 \end{bmatrix}$$

$$T_{xxxx} = T_{dxy}^{(1)} + 2T_{dxy}^{(2)} - T_{gbz}^{(1)}$$

$$T_{zzxy} = T_{dxy}^{(1)} + 2T_{gbz}^{(1)}$$

$$T_{yzzx} = T_{dxy}^{(2)} + 2T_{gbz}^{(1)}$$

* Rank 4 tensor (ssa).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & T_{xxxx} \\ 0 & 0 & 0 & 0 & 0 & T_{xxxx} \\ 0 & 0 & 0 & 0 & 0 & T_{zzxy} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -T_{xxxx} & -T_{xxxx} & -T_{zzxy} & 0 & 0 & 0 \end{bmatrix}$$

$$T_{xxxx} = 2M_{fbz}^{(1)} + T_{dxy}^{(3)}$$

$$T_{zzxy} = -4M_{fbz}^{(1)} + T_{dxy}^{(3)}$$

* Rank 4 tensor (aas).

$$\begin{bmatrix} 0 & T_{yzzx} & 0 \\ T_{yzzx} & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$T_{yzzx} = 2T_{dxy}^{(4)}$$

* Rank 4 tensor (aaa). * Rank 4 tensor (sa).

$$\begin{bmatrix} 0 & 0 & T_{xxxz} \\ 0 & 0 & -T_{xxxy} \\ 0 & 0 & 0 \\ 0 & T_{yzzx} & 0 \\ -T_{yzzx} & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{aligned} T_{xxxy} &= M_{fbz}^{(2)} - 2T_{dxy}^{(5)} \\ T_{yzzx} &= -M_{fbz}^{(2)} - T_{dxy}^{(5)} \end{aligned}$$

* Rank 4 tensor (as).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & T_{yzzx} & 0 \\ 0 & 0 & 0 & -T_{yzzx} & 0 & 0 \\ T_{xyxx} & -T_{xyxx} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\begin{aligned} T_{yzzx} &= M_{fbz}^{(3)} + T_{dxy}^{(6)} \\ T_{xyxx} &= M_{fbz}^{(3)} - 2T_{dxy}^{(6)} \end{aligned}$$

* Rank 4 tensor (s).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & T_{xxxy} & 0 & 0 & T_{xxyx} \\ 0 & 0 & 0 & 0 & 0 & T_{xxyx} & 0 & 0 & T_{xxxy} \\ 0 & 0 & 0 & 0 & 0 & T_{zzxy} & 0 & 0 & T_{zzxy} \\ 0 & 0 & 0 & 0 & T_{yzzx} & 0 & 0 & T_{yzzx} & 0 \\ 0 & 0 & 0 & T_{yzzx} & 0 & 0 & T_{yzzx} & 0 & 0 \\ T_{xyxx} & T_{xyxx} & T_{xyzz} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$T_{xxxy} = 2M_{fbz}^{(1)} + M_{fbz}^{(2)} + T_{dxy}^{(1)} + 2T_{dxy}^{(2)} + T_{dxy}^{(3)} - 2T_{dxy}^{(5)} - T_{gbz}^{(1)}$$

$$T_{xxyx} = 2M_{fbz}^{(1)} - M_{fbz}^{(2)} + T_{dxy}^{(1)} + 2T_{dxy}^{(2)} + T_{dxy}^{(3)} + 2T_{dxy}^{(5)} - T_{gbz}^{(1)}$$

$$T_{zzxy} = -4M_{fbz}^{(1)} + T_{dxy}^{(1)} + T_{dxy}^{(3)} + 2T_{gbz}^{(1)}$$

$$T_{yzzx} = -M_{fbz}^{(2)} + T_{dxy}^{(2)} - T_{dxy}^{(5)} + 2T_{gbz}^{(1)}$$

$$T_{yzzx} = M_{fbz}^{(2)} + T_{dxy}^{(2)} + T_{dxy}^{(5)} + 2T_{gbz}^{(1)}$$

$$T_{xyxx} = -2M_{fbz}^{(1)} + T_{dxy}^{(1)} + 2T_{dxy}^{(2)} - T_{dxy}^{(3)} - T_{gbz}^{(1)}$$

$$T_{xyzz} = 4M_{fbz}^{(1)} + T_{dxy}^{(1)} - T_{dxy}^{(3)} + 2T_{gbz}^{(1)}$$

* Rank 4 tensor (a).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & T_{yzzx} & 0 & 0 & T_{yzzx} & 0 \\ 0 & 0 & 0 & -T_{yzzx} & 0 & 0 & -T_{yzzx} & 0 & 0 \\ T_{xyxx} & -T_{xyxx} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$T_{yzzx} = M_{fbz}^{(3)} + 2T_{dxy}^{(4)} + T_{dxy}^{(6)}$$

$$T_{yzzx} = M_{fbz}^{(3)} - 2T_{dxy}^{(4)} + T_{dxy}^{(6)}$$

$$T_{xyxx} = M_{fbz}^{(3)} - 2T_{dxy}^{(6)}$$

* Rank 4 tensor (t).

$$\begin{bmatrix} 0 & T_{xxyy} & 0 \\ T_{xxxz} & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & T_{zzxy} & 0 \\ T_{xxyx} & 0 & 0 \\ T_{yzxx} & 0 & 0 \\ 0 & 0 & 0 \\ 0 & T_{xyyy} & 0 \\ 0 & 0 & -\frac{T_{xxxx}}{2} - \frac{T_{xxyx}}{2} + T_{xyyy} + T_{zzxy} \end{bmatrix}$$

$$T_{xxxx} = T_{dxy}^{(1)} + 2T_{dxy}^{(2)} + T_{dxy}^{(3)} - 2T_{dxy}^{(5)} - T_{gbz}^{(1)}$$

$$T_{zzxy} = T_{dxy}^{(1)} + T_{dxy}^{(3)} + 2T_{gbz}^{(1)}$$

$$T_{xxyx} = T_{dxy}^{(1)} + 2T_{dxy}^{(2)} + T_{dxy}^{(3)} + 2T_{dxy}^{(5)} - T_{gbz}^{(1)}$$

$$T_{yzxx} = T_{dxy}^{(2)} - T_{dxy}^{(5)} + 2T_{gbz}^{(1)}$$

$$T_{xyyy} = T_{dxy}^{(1)} + 2T_{dxy}^{(2)} - T_{dxy}^{(3)} - T_{gbz}^{(1)}$$