

MPG No. 33.3.133 $\bar{4}'2'm$ (-4'm2' setting) [Type III, tetragonal] [G tensor]

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

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

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

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

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

$$G_{yzx} = -3Q_{du}^{(1)}$$

* Rank 3 tensor (a).

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

$$G_{yzx} = -Q_{du}^{(2)} + Q_s^{(1)}$$

$$G_{xyz} = 2Q_{du}^{(2)} + Q_s^{(1)}$$

* Rank 4 tensor (sss).

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

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

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

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

* Rank 4 tensor (ssa).

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

$$G_{xxxx} = G_{dxy}^{(3)} + 2Q_{fbz}^{(1)}$$

$$G_{zzxy} = G_{dxy}^{(3)} - 4Q_{fbz}^{(1)}$$

* Rank 4 tensor (aas).

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

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

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

$$\begin{bmatrix} 0 & 0 & G_{xxx} \\ 0 & 0 & -G_{xxx} \\ 0 & 0 & 0 \\ 0 & G_{yzzx} & 0 \\ -G_{yzzx} & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{aligned} G_{xxx} &= -2G_{dxy}^{(5)} + Q_{fbz}^{(2)} \\ G_{yzzx} &= -G_{dxy}^{(5)} - Q_{fbz}^{(2)} \end{aligned}$$

* Rank 4 tensor (as).

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

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

* Rank 4 tensor (s).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & G_{xxx} & 0 & 0 & G_{xxyx} \\ 0 & 0 & 0 & 0 & 0 & G_{xxx} & 0 & 0 & G_{xxy} \\ 0 & 0 & 0 & 0 & 0 & G_{zzy} & 0 & 0 & G_{zzy} \\ 0 & 0 & 0 & 0 & G_{yzzx} & 0 & 0 & G_{yzzx} & 0 \\ 0 & 0 & 0 & G_{yzzx} & 0 & 0 & G_{yzzx} & 0 & 0 \\ G_{xyxx} & G_{xyxx} & G_{xyzz} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\begin{aligned} G_{xxx} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} - 2G_{dxy}^{(5)} - G_{gbz}^{(1)} + 2Q_{fbz}^{(1)} + Q_{fbz}^{(2)} \\ G_{xxy} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} + G_{dxy}^{(3)} + 2G_{dxy}^{(5)} - G_{gbz}^{(1)} + 2Q_{fbz}^{(1)} - Q_{fbz}^{(2)} \\ G_{zzy} &= G_{dxy}^{(1)} + G_{dxy}^{(3)} + 2G_{gbz}^{(1)} - 4Q_{fbz}^{(1)} \\ G_{yzzx} &= G_{dxy}^{(2)} - G_{dxy}^{(5)} + 2G_{gbz}^{(1)} - Q_{fbz}^{(2)} \\ G_{yzzx} &= G_{dxy}^{(2)} + G_{dxy}^{(5)} + 2G_{gbz}^{(1)} + Q_{fbz}^{(2)} \\ G_{xyxx} &= G_{dxy}^{(1)} + 2G_{dxy}^{(2)} - G_{dxy}^{(3)} - G_{gbz}^{(1)} - 2Q_{fbz}^{(1)} \\ G_{xyzz} &= G_{dxy}^{(1)} - G_{dxy}^{(3)} + 2G_{gbz}^{(1)} + 4Q_{fbz}^{(1)} \end{aligned}$$

* Rank 4 tensor (a).

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

$$\begin{aligned} G_{yzzx} &= 2G_{dxy}^{(4)} + G_{dxy}^{(6)} + Q_{fbz}^{(3)} \\ G_{yzzx} &= -2G_{dxy}^{(4)} + G_{dxy}^{(6)} + Q_{fbz}^{(3)} \\ G_{xyxx} &= -2G_{dxy}^{(6)} + Q_{fbz}^{(3)} \end{aligned}$$

* Rank 4 tensor (t).

$$\begin{bmatrix} 0 & G_{xxx} & 0 \\ G_{xxxy} & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & G_{zzyx} & 0 \\ G_{xxyx} & 0 & 0 \\ G_{yzzx} & 0 & 0 \\ 0 & 0 & 0 \\ 0 & G_{xyyy} & 0 \\ 0 & 0 & -\frac{G_{xxx}}{2} - \frac{G_{xyyx}}{2} + G_{xyyy} + G_{zzyx} \end{bmatrix}$$

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

$$G_{zzyx} = G_{dxy}^{(1)} + G_{dxy}^{(3)} + 2G_{gbz}^{(1)}$$

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

$$G_{yzzx} = G_{dxy}^{(2)} - G_{dxy}^{(5)} + 2G_{gbz}^{(1)}$$

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