

MPG No. 14.3.50 $\bar{4}'2'm$ (-4'2'm setting) [Type III, tetragonal] [G tensor]

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

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

$$G_{xx} = G_{dv}^{(1)}$$

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

$$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ G_{y_{zx}} & 0 & 0 \\ 0 & -G_{y_{zx}} & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

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

* Rank 3 tensor (a).

$$\begin{bmatrix} G_{y_{zx}} & 0 & 0 \\ 0 & G_{y_{zx}} & 0 \\ 0 & 0 & G_{xyz} \end{bmatrix}$$

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

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

* Rank 4 tensor (sss).

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

$$G_{xxxx} = 2G_{dv}^{(1)} + 4G_{dv}^{(2)} + G_{gv}^{(1)}$$

$$G_{xxzz} = G_{dv}^{(1)} - G_{gv}^{(1)}$$

$$G_{yzyz} = -G_{dv}^{(2)} + G_{gv}^{(1)}$$

* Rank 4 tensor (ssa).

$$\begin{bmatrix} 0 & G_{xxyy} & G_{xxzz} & 0 & 0 & 0 \\ -G_{xxyy} & 0 & -G_{xxzz} & 0 & 0 & 0 \\ -G_{xxzz} & G_{xxzz} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$G_{xxyy} = -2G_{dv}^{(3)} + 4Q_{f3}^{(1)}$$

$$G_{xxzz} = -G_{dv}^{(3)} - 4Q_{f3}^{(1)}$$

* Rank 4 tensor (aas).

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

$$G_{yzyz} = 2G_{dv}^{(4)}$$

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

$$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ G_{yzyz} & 0 & 0 \\ 0 & G_{yzyz} & 0 \\ 0 & 0 & G_{xyxy} \end{bmatrix}$$

$$\begin{aligned} G_{yzyz} &= -G_{dv}^{(5)} + Q_{f3}^{(2)} \\ G_{xyxy} &= 2G_{dv}^{(5)} + Q_{f3}^{(2)} \end{aligned}$$

* Rank 4 tensor (as).

$$\begin{bmatrix} 0 & 0 & 0 & G_{yzyz} & 0 & 0 \\ 0 & 0 & 0 & 0 & G_{yzyz} & 0 \\ 0 & 0 & 0 & 0 & 0 & G_{xyxy} \end{bmatrix}$$

$$\begin{aligned} G_{yzyz} &= -G_{dv}^{(6)} + Q_{f3}^{(3)} \\ G_{xyxy} &= 2G_{dv}^{(6)} + Q_{f3}^{(3)} \end{aligned}$$

* Rank 4 tensor (s).

$$\begin{bmatrix} G_{xxxx} & G_{xxyy} & G_{xxzz} & 0 & 0 & 0 & 0 & 0 & 0 \\ -G_{xxyy} & -G_{xxxx} & -G_{xxzz} & 0 & 0 & 0 & 0 & 0 & 0 \\ G_{zzxx} & -G_{zxxx} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & G_{yzyz} & 0 & 0 & G_{yzyy} & 0 & 0 \\ 0 & 0 & 0 & 0 & -G_{yzyy} & 0 & 0 & -G_{yzyz} & 0 \\ 0 & 0 & 0 & 0 & 0 & G_{xyxy} & 0 & 0 & -G_{xyxy} \end{bmatrix}$$

$$\begin{aligned} G_{xxxx} &= 2G_{dv}^{(1)} + 4G_{dv}^{(2)} + G_{gv}^{(1)} \\ G_{xxyy} &= -2G_{dv}^{(3)} + 4Q_{f3}^{(1)} \\ G_{xxzz} &= G_{dv}^{(1)} - G_{dv}^{(3)} - G_{gv}^{(1)} - 4Q_{f3}^{(1)} \\ G_{zxxx} &= G_{dv}^{(1)} + G_{dv}^{(3)} - G_{gv}^{(1)} + 4Q_{f3}^{(1)} \\ G_{yzyz} &= -G_{dv}^{(2)} - G_{dv}^{(5)} + G_{gv}^{(1)} + Q_{f3}^{(2)} \\ G_{yzyy} &= -G_{dv}^{(2)} + G_{dv}^{(5)} + G_{gv}^{(1)} - Q_{f3}^{(2)} \\ G_{xyxy} &= 2G_{dv}^{(5)} + Q_{f3}^{(2)} \end{aligned}$$

* Rank 4 tensor (a).

$$\begin{bmatrix} 0 & 0 & 0 & G_{yzyz} & 0 & 0 & G_{yzyy} & 0 & 0 \\ 0 & 0 & 0 & 0 & G_{yzyy} & 0 & 0 & G_{yzyz} & 0 \\ 0 & 0 & 0 & 0 & 0 & G_{xyxy} & 0 & 0 & G_{xyxy} \end{bmatrix}$$

$$\begin{aligned} G_{yzyz} &= 2G_{dv}^{(4)} - G_{dv}^{(6)} + Q_{f3}^{(3)} \\ G_{yzyy} &= -2G_{dv}^{(4)} - G_{dv}^{(6)} + Q_{f3}^{(3)} \\ G_{xyxy} &= 2G_{dv}^{(6)} + Q_{f3}^{(3)} \end{aligned}$$

* Rank 4 tensor (t).

$$\begin{bmatrix} G_{xxxx} & 0 & 0 \\ 0 & -G_{xxxx} & 0 \\ 0 & 0 & 0 \\ 0 & 0 & G_{yyzz} \\ G_{zzxx} & 0 & 0 \\ 0 & -G_{yzzz} - G_{zzxx} & 0 \\ 0 & G_{yzyz} & 0 \\ 0 & 0 & G_{zxzx} \\ -G_{yzyz} - G_{zxzx} & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$G_{xxxx} = 2G_{dv}^{(1)} + 4G_{dv}^{(2)} + G_{gv}^{(1)}$$

$$G_{yyzz} = -G_{dv}^{(1)} + G_{dv}^{(3)} + G_{gv}^{(1)}$$

$$G_{zzxx} = G_{dv}^{(1)} + G_{dv}^{(3)} - G_{gv}^{(1)}$$

$$G_{yzyz} = -G_{dv}^{(2)} + G_{dv}^{(5)} + G_{gv}^{(1)}$$

$$G_{zxzx} = G_{dv}^{(2)} + G_{dv}^{(5)} - G_{gv}^{(1)}$$