P6 (44)

$$\alpha_{lmjpk} = \sqrt{\frac{(2j+1)(2l+1)(2k+1)}{4\pi}} \begin{pmatrix} j & l & k \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} j & l & k \\ p & m & -(m+p \end{pmatrix}$$

$$-\frac{1}{2}\left(C_{j,p,1}C_{l,m,2}\sum\sum a_{l'}^{m'}Y_{l'}^{m'} + C_{j,p,2}C_{l,m,1}\sum\sum b_{l'}^{m'}Y_{l'}^{m'}\right) - mp\, c_{l'}^{m'}Y_{l'}^{m'}$$

$$=(-1)\left[Y_k^{p+m}\,\frac{1}{2}C_{jp1}C_{lm2}(-1)^{p+m}\sum_{k=|l-j|}^{|l+j|}\alpha_{l(m+1)j(p+1)k} + \frac{1}{2}Y_k^{p+m}C_{jp2}C_{lm1}(-1)^{p+m}\sum_{k=|l-j|}^{|l+j|}\alpha_{l(m+1)j(p-1)k} + mp\,(-1)^{m+p}\sum\alpha_{lmjpk}Y_k^{m+p}\right]$$

$+1)$

$$=(-1)\times Y_k^{p+m}(-1)^{p+m}\sum_{k=|l-j|}^{|l+j|}\left[\frac{1}{2}C_{jp1}C_{lm2}\,\alpha_{l(m+1)j(p+1)k} + \underbrace{\frac{1}{2}C_{jp2}C_{lm1}\,\alpha_{l(m+1)j(p-1)k} + mp\,\alpha_{lmjpk}}_{③}\right]$$

$$= -\sqrt{\frac{(2j+1)(2l+1)(2k+1)}{4\pi}}\begin{pmatrix} j & l & k \\ 0 & 0 & 0 \end{pmatrix}\left[\frac{1}{2}C_{jp1}C_{lm2}\begin{pmatrix} j & l & k \\ p+1 & m-1 & -(p+m) \end{pmatrix} + \frac{1}{2}C_{jp2}C_{lm1}\begin{pmatrix} j & l & k \\ p-1 & m+1 & -(m+p) \end{pmatrix} + mp\begin{pmatrix} j & l & k \\ p & m & -(m+p) \end{pmatrix}\right]$$

(−)

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$$\frac{① + ①}{2} =$$

$$\frac{① + ②}{2} = \frac{1}{2}\begin{pmatrix} k & j & l \\ -(m+p) & p & m \end{pmatrix}\left[k(k+1) - j(j+1) - l(l+1) - 2pm + pm\right]$$

$\sqrt{(j\,p)(}$ ⅰ ③

$$= \frac{1}{2}\begin{pmatrix} k & j & l \\ -(m+p) & p & m \end{pmatrix}\left(k^2 - j^2 - l^2 + k - j - l - 2pm + 2pm\right)$$

$$= \frac{1}{2}\begin{pmatrix} k & j & l \\ -(m+p) & p & m \end{pmatrix}\left(k^2 - j^2 - l^2 + k - j - l\right)$$