$$Y_{l_1}^{m_1} Y_{l_2}^{m_2} = \sum_{l=0}^{\infty} \sum_{m=-l}^{l} a_l^m Y_l^m$$

$$\int_0^{2\pi}\int_0^{\pi} Y_{l_1}^{m_1} Y_{l_2}^{m_2} \overline{Y_{l'}^{m'}} \sin\theta d\theta d\phi = \iint \sum_{l=0}^{\infty} \sum_{m=-l}^{l} a_l^m Y_l^m \overline{Y_{l'}^{m'}} \sin\theta d\theta d\phi$$

$$\iint Y_{l_1}^{m_1} Y_{l_2}^{m_2} (-1)^{m'} Y_{l'}^{-m'} \sin\theta d\theta d\phi = a_{l'}^{m'} \quad \text{... using (7)}$$

$$\Rightarrow (-1)^{m'} \left[\frac{(2l_1+1)(2l_2+1)(2l'+1)}{4\pi}\right]^{1/2} \begin{pmatrix} l_1 & l_2 & l' \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} l_1 & l_2 & l' \\ m_1 & m_2 & -m' \end{pmatrix} = \underline{\underline{a_{l'}^{m'}}} \quad \text{... using (13)} \quad ①$$

$$\underbrace{Y_{l_1}^{m_1} Y_{l_2}^{m_2}} Y_{l_3}^{m_3} = \sum_{l^*=0}^{\infty} \sum_{m^*=-l^*}^{l^*} b_{l^*}^{m^*} Y_{l^*}^{m^*}$$

$$\sum_{l=0}^{\infty} \sum_{m=-l}^{l} a_l^m Y_l^m Y_{l_3}^{m_3} = \sum_{l^*=0}^{\infty} \sum_{m^*=-l^*}^{l^*} b_{l^*}^{m^*} Y_{l^*}^{m^*},$$ multiplied by both sides by $\overline{Y_{l'}^{m'}}$, then $\iint \sin\theta d\theta d\phi$

$$\iint \sum_{l=0}^{\infty} \sum_{m=-l}^{l} a_l^m Y_l^m Y_{l_3}^{m_3} (-1)^{m'} Y_{l'}^{-m'} \sin\theta d\theta d\phi = b_{l'}^{m'} \quad \text{... using (7)}$$

$$\sum_{l=0}^{\infty} \sum_{m=-l}^{l} a_l^m (-1)^{m'} \left[\frac{(2l+1)(2l_3+1)(2l'+1)}{4\pi}\right]^{1/2} \begin{pmatrix} l & l_3 & l' \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} l & l_3 & l' \\ m & m_3 & -m' \end{pmatrix} = \underline{\underline{b_{l'}^{m'}}} \quad \text{... using (13)}$$

where a_l^m is shown in the first part ①