Beide Sorten der Filme (gehärtete sowie nicht gehärtete) dehnen sich um so weniger, je näher der Pm-Wert dem des isoelektrischen Punktes liegt.

Die bei höherer Temperatur gefertigten Filme dehnen sich stärker als die bei niedrigerer Temperatur bereiteten.

References

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ing. He showed that the scattering through a given angle and for a given wavelength is characterised by the 16 coefficients which express the four polarisation parameters of the scattered beam in terms of the four corresponding parameters of the incident beam. He also established the reciprocity law [1] and proved that it leads to six relations between these sixteen coefficients.

We can apply the Stokes linear representation of the polarisation of light beams to the present problem, in view of the linearity of the Maxwell equations. As the scattering particle gets only oriented in the applied field and does not undergo any change in its properties depending on the magnetic field like a plasma, the scattering properties will not be influenced by the external field because the solution corresponding to the fixed field can be linearly added to the solution corresponding to the periodic field.

Let

\[
[a_{11} a_{12} a_{13} a_{14} \\
0 a_{21} a_{22} a_{23} a_{24} \\
0 0 a_{31} a_{32} a_{33} a_{34} \\
0 0 0 a_{41} a_{42} a_{43} a_{44}]
\]

represent the scattering coefficients of a medium subjected to an external field corresponding to case (i). Consider an elliptically polarised beam \(F_1\) having an intensity \(I_1\), coming from an elliptic polariser \(N\), after scattering giving rise to another beam from which we separate a polarised component \(F_1'\) having an intensity \(I_1'\) by means of an elliptic polariser \(N'\). Let us associate with these beams the inverse beams, that is to say an incident polarised beam \(F_2\) coming from the polariser \(N'\) with an intensity \(I_2\) in the direction opposite to that of the emergent beam \(F_1'\) and the corresponding emerging beam \(F_2'\) coming out of the polariser \(N\) in the direction opposite to that of the incident beam \(F_1\), taking care to orient the magnetic field along \(F_1'\). We will have to make use of a new set of scattering coefficients in this case, because the directions of incidence and scattering are not equivalent due to the presence of the external field. Applying the ideas of reciprocity and following the arguments of Perrin, the scattering coefficients of the medium corresponding to case (ii) work out as:

\[
a'_{ik} = \begin{bmatrix}
a_{11} & a_{21} & -a_{31} & a_{41} \\
a_{12} & a_{22} & -a_{32} & a_{42} \\
-a_{13} & -a_{23} & a_{33} & -a_{43} \\
a_{14} & a_{24} & -a_{34} & a_{44}
\end{bmatrix}
\]

If now we cut off the external field, the incident and scattering directions become equivalent. Consequently \(a'_{ik} = a_k\) and the scattering coefficients of the medium reduce to that of a symmetric medium treated by Perrin.

The depolarisation ratios \(\varrho_v\) and \(\varrho_h\) can easily be calculated for case (i) as:

\[
\varrho_v = \frac{a_{11} + a_{12} + a_{13} + a_{14}}{a_{11} - a_{12} - a_{13} + a_{14}} \quad [4]
\]

\[
\varrho_h = \frac{a_{11} + a_{12} - a_{13} + a_{14}}{a_{11} + a_{12} + a_{13} + a_{14}} \quad [5]
\]

and for case (ii) as:

\[
\varrho_v' = \frac{a_{11} - a_{12} + a_{13} + a_{14}}{a_{11} + a_{12} + a_{13} - a_{14}} \quad [6]
\]

\[
\varrho_h' = \frac{a_{11} + a_{12} - a_{13} - a_{14}}{a_{11} + a_{12} + a_{13} + a_{14}} \quad [7]
\]

It is not difficult to see that the product \(\varrho_v \cdot \varrho_h\) for case (i) is equal to the product \(\varrho_v' \cdot \varrho_h'\) for case (ii). The following table prepared from the data of Krishnan gives experimental evidence for the existence of reciprocal relations between the two cases.

<table>
<thead>
<tr>
<th>Field strength in gauss</th>
<th>(\varrho_v \cdot \varrho_h) for case (i)</th>
<th>(\varrho_v' \cdot \varrho_h') for case (ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1120</td>
<td>.034</td>
<td>.035</td>
</tr>
<tr>
<td>4060</td>
<td>.060</td>
<td>.059</td>
</tr>
<tr>
<td>5730</td>
<td>.088</td>
<td>.081</td>
</tr>
<tr>
<td>6860</td>
<td>.110</td>
<td>.088</td>
</tr>
</tbody>
</table>

Proceeding further, the intensity of the component of the scattered light having its electric vector inclined at an angle \(B\) to the vertical, with the incident light polarised at an angle \(A\) to the vertical, the external field direction being parallel to the incident light, is (case i)

\[
I_A = a_{11} - a_{12} \cos 2A + a_{13} \sin 2A - a_{14} \cos 2B + a_{22} \cos 2A \cos 2B - a_{23} \sin 2A \cos 2B - a_{24} \sin 2A \sin 2B + a_{31} \sin 2B + a_{32} \cos 2A \sin 2B - a_{33} \sin 2A \cos 2B - a_{34} \cos 2A \sin 2B - a_{41} \cos 2A - a_{42} \sin 2A \cos 2B - a_{43} \sin 2A \sin 2B + a_{44} \cos 2A \sin 2B \quad [8]
\]

In a similar manner, the intensity \(I_A'\) for case (ii) is

\[
I_A' = a_{11} - a_{12} \cos 2B - a_{13} \sin 2B - a_{14} \cos 2A + a_{22} \cos 2A \cos 2B + a_{23} \sin 2A \cos 2B + a_{24} \sin 2A \sin 2B + a_{31} \sin 2A + a_{32} \cos 2A \sin 2B + a_{33} \sin 2A \cos 2B - a_{34} \cos 2A \sin 2B - a_{41} \cos 2A + a_{42} \sin 2A \cos 2B + a_{43} \sin 2A \sin 2B + a_{44} \cos 2A \sin 2B \quad [9]
\]

We see from [8] and [9] that the intensities of the scattered light corresponding to the cases (i) and (ii) are connected by the simple relation

\[
I_A' = I_A. \quad [10]
\]