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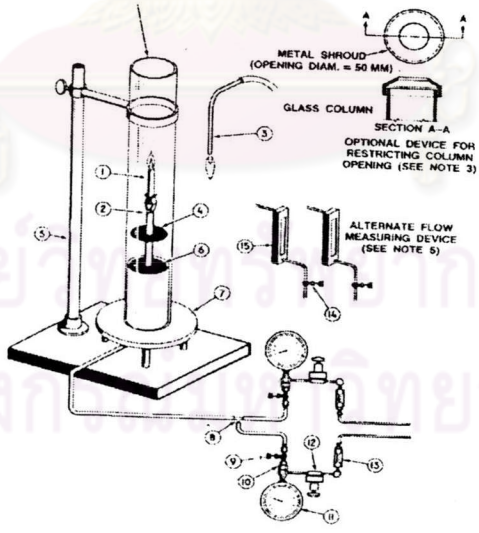
APPENDICES

APPENDICES

A-1 Limiting Oxygen Index (LOI) ASTM D2863-70: the minimum concentration of oxygen, expressed as volume percent, in a mixture of oxygen and nitrogen that will just support flaming combustion of a material initially at room temperature. The LOI method used for self-supporting samples has been modified as described below to accommodate the viscous of powdery samples. The measurement was carried out as follows. About 1 g of the polymer sample was placed in a glass cup (diameter 20 mm, height 10 mm) fitted to the specimen holder. An external flame of 20 mm length was maintained in contact, for 10 s, with the polymer. The LOI value was taken as the minimum percentages of oxygen required in a nitrogen-oxygen atmosphere, surrounding the sample, to maintain its combustion for at least 30 s after ignition. The LOI value was taken as the average of five experiments each.

Apparatus



1. Burning Specimen
2. Clamp with Rod Support
3. Igniter
4. Wire Screen
5. Ring Stand
6. Glass Beads in a Bed
7. Brass Base
8. Tee
9. Cut-off valve
10. Orifice in Holder
11. Pressure Gage
12. Precision Pressure Regulator
13. Filter
14. Needle Valve
15. Rotameter

Figure A.1 LOI apparatus

Procedure

1. Select an initial concentration of oxygen to be used. Whenever possible, base the initial concentration an experience of results for similar materials. Alternatively, try to ignite the sample in air, and note the burning behavior. If the sample burns rapidly, start at a concentration of about 18 %, but if the sample does not continue to burn in air, select an initial concentration of at least 25 %, depending on the difficulty of ignition or the period of burning.
2. Set the flow valves so that the desired initial concentration of oxygen is flowing through the column.
3. Allow the gas to flow for 30 seconds to purge the system.
4. Ignite the sample with the ignition flame so that the sample is well lighted. Remove the ignition flame.
5. If the sample does not burn, adjust the oxygen concentration.
6. Continue repeating 4. To 5. Until the critical concentration of oxygen is determined.
7. Perform the test at least three times.

A-2 Inherent viscosity [η_{inh}] ASTM D2270: Inherent viscosity is calculated from the dilute solution (1% or less) relative viscosity of the polymer. The inherent viscosity is calculated as:

$$\eta_{inh} = \ln \eta_{rel}/C$$

where C = concentration of the polymer in grams per 100 ml of solvent; usually, C = 0.50; ln η_{rel} = natural logarithm of the relative viscosity of dilute (1 % or less) polymer solution.

Relative viscosity can be taken as the ratio of the flow times of a polymer solution and the pure solvent in the same viscometer and at the same temperature. Relative viscosity values generally are used for calculating the intrinsic or inherent

viscosity of a polymer. The solvent to be used will depend on the polymer solubility. In general, the solvent should completely dissolve the sample in less than 30 minutes. It is desirable that the polymer be dissolved at room temperature although, heating is permissible if no degradation occurs. Select the viscometer through which the solvent will flow in not less than 100 seconds and not more than 200 seconds.

VITAE

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