

**Lyotropic Mesophases of Cellulose in the
Ammonia/Ammonium Thiocyanate Solvent System.
III. Phase behavior**

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The mesophase behavior of cellulose in the $\text{NH}_3/\text{NH}_4\text{SCN}$ solvent has been studied as a function of cellulose concentration and solvent composition at 25°C . The compositions for incipience of mesophase formation and for wholly anisotropic phase formation were determined at various solvent compositions. The biphasic gap between the two respective phases decreased when the NH_4SCN concentration approaches 75.5 % in the $\text{NH}_3/\text{NH}_4\text{SCN}$ solvent and when concurrently, cellulose concentration decreased. The minimum cellulose concentration for mesophase formation was in the range of 0.02 to 0.045 in volume fraction with variation of solvent composition. Both NH_4SCN and cellulose in the biphasic solutions showed partitioning between the isotropic and the anisotropic phases. The cellulose concentration difference between the respective phases decreased with increasing NH_4SCN concentration up to 75.5 wt. % (40.8 mole %). Also the partitioning of cellulose depends on the solvent composition showing minimum partitioning at 75.5 % NH_4SCN . The partitioning behavior was explained in terms of polymer-solvent interaction.