Wax Precipitation Modeled with Many Mixed Solid Phases

The behavior of the Coutinho UNIQUAC model for solid wax phases has been examined. The model can produce as many mixed solid phases as the number of waxy components. In binary mixtures, the solid rich in the lighter component contains little of the heavier component but the second phase shows substantial amounts of the lighter component dissolved in the heavier solid. Calculations have been performed taking into account the recrystallization of the solid alkanes into a second solid form. The Coutinho UNIQUAC model has been used to describe the lower-temperature solid phases. The higher-temperature mixed solid phase has been assumed to be either an ideal solution or to be described by Coutinho's Wilson activity coefficient model. This procedure accounts for more of the known behavior of mixed n-alkane solids. Comparison is also made with results assuming that all of the solid phases, both high-temperature and low-temperature forms, are pure. Model calculations compare well with the data of Pauly et al. for C18 to C30 waxes precipitating from n-decane solutions. (C) 2004 American Institute of Chemical Engineers.

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