

SYNTHESIS OF PYRROLE FROM MORPHOLINE

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Pyrrrole is formed when morpholine is passed through a layer of an aluminum-chromium catalyst at 400-440°. In addition to pyrrole, the liquid products contain acetonitrile, resin, and water. The gaseous products consist primarily of hydrogen.

The experiments were carried out in a flow apparatus. A quartz reactor was charged with 100 ml (bulk volume) of aluminum-chromium catalyst with a Cr_2O_3 - Al_2O_3 composition of 10:90 wt. %.

The morpholine was passed through the catalyst bed at a rate of 0.1 h^{-1} . The resulting catalyzate was analyzed by gas-liquid chromatography with a KhL-69 chromatograph with a thermal-conductivity detector, a thermostat temperature of 175°, a column 2.1 m long and 4 mm in diameter, a polyethylene glycol adipate (PEGA)/Cellite-545 phase, and a carrier-gas (helium) flow rate of 60 ml/min.

In addition, the catalyzate was rectified. The pyrrole fraction, isolated in 22% yield (with respect to morpholine), with bp 130-131°, n_D^{20} 1.5065, and d_4^{24} 0.960, gave a characteristic color with a pine splint moistened with hydrochloric acid. IR spectrum (in KBr): 3400-3420 and 1490-1580 for NH-, 2950-2975 and 1500-1600 for -C=C- , and 2850 cm^{-1} for C-H. The absorption at 1250 cm^{-1} that is characteristic for the -C-O-C- group was absent.

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