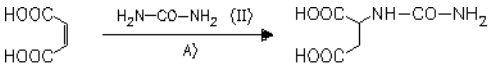
addition reactions

O 0060

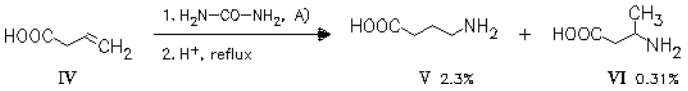
31 - 032

On the Role of Urea in Chemical Evolution of Biomolecules. Part 2. Flame-Induced Addition of Urea to Unsaturated Carboxylic Acids. — Blowing a hydrogen–oxygen flame against the surface of an aqueous solution of maleic acid (I) and urea (II) leads to the formation of N-carbamoylaspartic acid (III), which is possibly formed by the addition of an amidinoxyl radical to the C–C double bond of (I), followed by a thermal rearrangement of an amidinoxy to an ureido group. The radical mechanism is confirmed by reaction of butenoic acid (IV) with urea. Because the efforts to separate the expected products are unsuccessful, the reaction mixture is hydrolyzed to give the butyric acids (V) and (VI). The results offer a novel pathway leading to formation of amino acids from non-amino precursors. — (TERASAKI, MASANORI; NOMOTO, SHINYA; MITA, HAJIME; SHIMOYAMA, AKIRA; Bull. Chem. Soc. Jpn. 75 (2002) 4, 855-856; Dep. Chem., Univ. Tsukuba, Tsukuba, Ibaraki 305, Japan; EN)



I III

A): H_2O, 60°C, [hydrogen-rich flame]



IV V 2.3% VI 0.31%