

Title (en)

PROCESS FOR THE CO-PRODUCTION OF BUTANE-1,4-DIOL AND -i(GAMMA)-BUTYROLACTONE.

Title (de)

VERFAHREN ZUR GLEICHZEITIGEN HERSTELLUNG VON 1,4-BUTANDIOL UND GAMMA-BUTYROLAKTON.

Title (fr)

PROCEDE POUR LA COPRODUCTION DE BUTANE-1,4-DIOL ET DE -i(GAMMA)-BUTYROLACTONE.

Publication

EP 0277168 A1 19880810 (EN)

Application

EP 87904919 A 19870731

Priority

- GB 8618889 A 19860801
- GB 8618894 A 19860801

Abstract (en)

[origin: WO8800937A1] A process for the co-production of butane-1,4-diol and gamma-butyrolactone which comprises: (a) esterifying maleic anhydride by reaction with an alkyl alcohol to form the corresponding dialkyl maleate; (b) hydrogenating resulting dialkyl maleate to yield a reaction product mixture comprising said alkyl alcohol, butane-1,4-diol and gamma-butyrolactone; (c) recovering alkyl alcohol from said reaction product mixture; (d) recycling recovered alkyl alcohol to step (a); and (e) recovering butane-1,4-diol and gamma-butyrolactone from the reaction product mixture of step (c); wherein said process comprises: (i) continuously supplying maleic anhydride and a molar excess of an alkyl alcohol to a monoesterification zone maintained at an elevated temperature thereby to form the corresponding mono-alkyl maleate; (ii) continuously supplying resulting mono-alkyl maleate in admixture with a molar excess of said alkyl alcohol to a primary catalytic esterification zone containing a charge of a solid esterification catalyst and maintained under esterification conditions thereby to form an intermediate ester-containing mixture containing a major amount of the corresponding dialkyl maleate and a minor amount of said mono-alkyl maleate; (iii) continuously supplying a first liquid feed comprising said monoalkyl maleate to a secondary esterification zone containing a charge of a solid esterification catalyst; (iv) continuously supplying a second feed stream comprising said alkyl alcohol to said secondary esterification zone; (v) maintaining said secondary esterification zone at an elevated temperature sufficient to form or maintain therein a vaporous stream containing said alkyl alcohol; (vi) intimately contacting said first liquid feed in said secondary esterification zone in the presence of said catalyst with said vaporous stream; (vii) recovering from said secondary esterification zone a vaporous effluent stream containing, in addition to alkyl alcohol vapour, also water in vapour form, said water being produced in said secondary esterification zone by esterification of said monoalkyl maleate with said alkyl alcohol; (viii) recovering from said secondary esterification zone a liquid product containing said dialkyl maleate; (ix) vaporising dialkyl maleate produced in said secondary esterification zone in a stream of a hydrogen-containing gas; (x) passing resulting vaporous dialkyl maleate containing stream through a plurality of hydrogenation zones connected in series, each containing a charge of a solid esterification catalyst and each maintained under ester hydrogenation conditions; (xi) controlling the reaction conditions in each of the plurality of hydrogenation zones so as to produce a predetermined butane-1,4-diol:gamma-butyrolactone molar ration in the reaction product mixture; and (xii) recovering from the reaction product mixture (1) an alkyl alcohol fraction, (2) a butane-1,4-diol fraction, and (3) a gamma-butyrolactone fraction.

Abstract (fr)

Le procédé décrit consiste à: (a) estérifier de l'anhydride maléique par réaction avec un alcool d'alkyle en vue de former le maléate de dialkyle correspondant; (b) hydrogéner le maléate de dialkyle résultant en vue d'obtenir un mélange de produits de réaction comprenant ledit alcool d'alkyle, du butane-1,4-diol et du gamma-butyrolactone; (c) recueillir l'alcool d'alkyle contenu dans ledit mélange de produits de réaction; (d) recycler vers l'étape (a) l'alcool d'alkyle recueilli; et (e) recueillir le butane-1,4-diol et le gamma butyrolactone contenu dans le mélange de produits de réaction de l'étape (c); ledit procédé consistant, dans le détail, à: (i) fournir en continu de l'anhydride maléique et un excédent molaire d'un alcool d'alkyle à une zone de mono-estérification maintenue à une température élevée pour ainsi former le maléate de mono-alkyle correspondant; (ii) fournir en continu le maléate de mono-alkyle résultant en mélange avec un excédent molaire dudit alcool d'alkyle à une zone d'estérification catalytique primaire contenant une charge d'un catalyseur d'estérification solide et maintenue dans des conditions d'estérification pour ainsi former un mélange intermédiaire à base d'esters et contenant une importante quantité du maléate de dialkyle correspondant et une faible quantité dudit maléate de mono-alkyle; (iii) fournir en continu une première charge liquide comportant ledit maléate de mono-alkyle à une zone d'estérification secondaire contenant une charge d'un catalyseur d'estérification solide; (iv) fournir en continu à ladite zone d'estérification secondaire un second courant d'alimentation comprenant ledit alcool d'alkyle; (v) maintenir ladite zone d'estérification secondaire à une température suffisamment élevée pour y former ou y maintenir un courant gazeux contenant ledit alcool d'alkyle; (vi) mettre en contact intime avec ledit courant gazeux ladite première charge liquide dans ladite zone d'estérification secondaire en présence dudit catalyseur; (vii) recueillir à partir de ladite zone

IPC 1-7

C07C 29/136; C07C 31/20; C07D 307/32

IPC 8 full level

B01J 23/86 (2006.01); **C07B 61/00** (2006.01); **C07C 27/00** (2006.01); **C07C 27/04** (2006.01); **C07C 29/149** (2006.01); **C07C 29/17** (2006.01); **C07C 31/20** (2006.01); **C07C 67/00** (2006.01); **C07D 307/33** (2006.01); **C07D 315/00** (2006.01)

CPC (source: EP)

C07C 29/177 (2013.01); **C07D 315/00** (2013.01)

Citation (search report)

See references of WO 8800937A1

Cited by

US5677068A

Designated contracting state (EPC)

AT BE CH DE FR GB IT LI LU NL SE

DOCDB simple family (publication)

WO 8800937 A1 19880211; EP 0277168 A1 19880810; JP H01500753 A 19890316

DOCDB simple family (application)

GB 8700547 W 19870731; EP 87904919 A 19870731; JP 50469187 A 19870731