



(51) International Patent Classification:

B01D 61/36 (2006.01) **C07C 69/54** (2006.01)
C07C 45/78 (2006.01) **B01D 71/02** (2006.01)
C07C 47/04 (2006.01)

(21) International Application Number:

PCT/JP2013/054639

(22) International Filing Date:

18 February 2013 (18.02.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

PCT/JP2012/054498

17 February 2012 (17.02.2012)

JP

(71) Applicant: **MITSUBISHI RAYON CO., LTD.** [JP/JP];
1-1, Marunouchi 1-chome, Chiyoda-ku, Tokyo, 1008253
(JP).

(72) Inventors: **HIMENO Yoshiyuki**; c/o Corporate Research
Laboratories, Mitsubishi Rayon Co., Ltd., 20-1, Miy-
uki-cho, Otake-shi, Hiroshima, 7390693 (JP). **OOYACHI**
Ken; c/o Corporate Research Laboratories, Mitsubishi
Rayon Co., Ltd., 20-1, Miyuki-cho, Otake-shi, Hiroshima,
7390693 (JP). **KONDO Masahide**; c/o Corporate Re-
search Laboratories, Mitsubishi Rayon Co., Ltd., 20-1,
Miyuki-cho, Otake-shi, Hiroshima, 7390693 (JP).

(74) Agents: **SHIGA Masatake** et al.; 1-9-2, Marunouchi,
Chiyoda-ku, Tokyo, 1006620 (JP).

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU,
RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: DEHYDRATION OF WATER CONTAINING SOURCE OF FORMALDEHYDE, AND A METHOD FOR PRODUCING AN ETHYLENICALLY UNSATURATED CARBOXYLIC ESTER

(57) Abstract: The present invention provides a method for dehydration of a water containing source of formaldehyde having an excellent dehydration performance, and a method for producing (meth)acrylic acid alkyl ester using a dehydrated source of formaldehyde. The present invention provides a method for dehydration of a water containing source of formaldehyde wherein water is separated from the water containing source of formaldehyde containing formaldehyde and water using a zeolite membrane wherein the water containing source of formaldehyde comprises a separation enhancer having a relative static permittivity of between 2.5 and 20 and wherein the water containing source of formaldehyde further contains methanol. The invention extends to a method for producing (meth)acrylic acid alkyl ester by reaction with carboxylic acid ester using a dehydrated source of formaldehyde obtained by a dehydration wherein water is separated from the water containing source of formaldehyde containing formaldehyde and water using a zeolite membrane.

