



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| <b>(51) International Patent Classification <sup>6</sup> :</b><br><b>C07C 51/31, 51/215, 51/265, B01J 19/00, B01D 3/36, 3/14</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>A1</b> | <b>(11) International Publication Number:</b> <b>WO 99/14179</b><br><b>(43) International Publication Date:</b> 25 March 1999 (25.03.99)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>(21) International Application Number:</b> PCT/US98/19099<br><b>(22) International Filing Date:</b> 14 September 1998 (14.09.98)<br><b>(30) Priority Data:</b><br>08/931,035      16 September 1997 (16.09.97)      US<br><b>(71) Applicant (for all designated States except US):</b><br>TWENTY-FIRST CENTURY RESEARCH CORPORATION [US/US]; 12 South Townview Lane, Newark, DE 19711-7419 (US).<br><b>(72) Inventors; and</b><br><b>(75) Inventors/Applicants (for US only):</b> DASSEL, Mark, W. [US/US]; P.O. Box 486, Indianola, WA 98342 (US). ROSTAMI, Ader, M. [IR/US]; 9205 Northeast Sea Ray Court, Bainbridge Island, WA 98110 (US). DE COSTER, David, C. [US/US]; 5509 234th Avenue East, Buckley, WA 98321 (US). VASSILIOU, Eustathios [US/US]; 12 South Townview Lane, Newark, DE 19711 (US).<br><b>(74) Agents:</b> PARKER, David, W. et al.; Seed and Berry LLP, 6300 Columbia Center, 701 Fifth Avenue, Seattle, WA 98104-7092 (US). |           | <b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Burasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).<br><br><b>Published</b><br><i>With international search report.</i><br><i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> |
| <b>(54) Title:</b> METHODS AND REACTOR DEVICES FOR REMOVING CATALYST AFTER OXIDATION OF HYDROCARBONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>(57) Abstract</b><br><p>This invention relates to methods and reactor devices for controlling the oxidation of hydrocarbons to intermediate oxidation products, such as adipic acid for example, by removing the catalyst from the reaction mixture, outside the reaction zone, after the oxidation has taken place at least partially. The catalyst is at least partially precipitated by reducing the water level in the reaction mixture and subjecting the reaction mixture to a temperature, at which or over which catalyst precipitates.</p>                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |