

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
12 December 2024 (12.12.2024)



(10) International Publication Number
WO 2024/251758 A1

- (51) **International Patent Classification:**
C07D 201/12 (2006.01) *C08J 11/14* (2006.01)
- (21) **International Application Number:**
PCT/EP2024/065380
- (22) **International Filing Date:**
05 June 2024 (05.06.2024)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
PCT/CN2023/098586
06 June 2023 (06.06.2023) CN
PCT/CN2023/133637
23 November 2023 (23.11.2023) CN

NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

- (84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, 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, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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

- (71) **Applicant:** BASF SE [DE/DE]; Carl-Bosch-Strasse 38, 67056 Ludwigshafen am Rhein (DE).
- (72) **Inventors:** BLEI, Stefan; Carl-Bosch-Strasse 38, 67056 Ludwigshafen am Rhein (DE). EL-TOUFALI, Faissal-Ali; Carl-Bosch-Strasse 38, 67056 Ludwigshafen am Rhein (DE). BEY, Oliver; Carl-Bosch-Strasse 38, 67056 Ludwigshafen am Rhein (DE). RAVIKUMAR, Vikram Raghavendhar; Carl-Bosch-Strasse 38, 67056 Ludwigshafen am Rhein (DE). VANDER STRAETEN, Bart; Scheldelaan 600, 2040 Antwerpen (BE). SCHREIBER, Michael; Carl-Bosch-Strasse 38, 67056 Ludwigshafen am Rhein (DE). LIU, Bao; No. 300, Jiangxinsha Road, Shanghai, 200137 (CN). DIENES, Christian; Carl-Bosch-Straße 38, 67056 Ludwigshafen am Rhein (DE).
- (74) **Agent:** ALTMANN STÖSSEL DICK PATENTAN-WÄLTE PARTG MBB; Andreas Altmann, Isartorplatz 1, 80331 München (DE).

- (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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA,

- (54) **Title:** PROCESS FOR HYDROLYTICALLY DEPOLYMERIZING A POLYAMIDE

- (57) **Abstract:** A process for hydrolytically depolymerizing a polyamide 6 comprised in a solid material M, the process comprising providing the solid material M; melting in a melting unit U_M the solid material M, obtaining a liquid stream S_M having a temperature T_{SM} at a pressure p_{SM} ; providing a liquid aqueous stream S_W having a temperature T_{SW} at a pressure p_{SW} ; admixing in a pre-reaction unit U_{PR} the stream S_M with the stream S_W , obtaining a liquid reaction feed stream S_F having a temperature T_{SF} at a pressure p_{SF} ; feeding the stream S_F into a chemical reaction unit U_R ; subjecting the stream S_F in the reaction unit U_R to polyamide 6 depolymerization conditions comprising a polyamide 6 depolymerization temperature T_D at a polyamide 6 depolymerization pressure p_D , obtaining in U_R an aqueous depolymerization mixture comprising ϵ -caprolactam dissolved in water; removing an aqueous liquid reactor exit stream S_R from U_R , the stream S_R comprising ϵ -caprolactam dissolved in water; wherein $0.8 \leq T_{SF}/T_D \leq 1.05$ and $0.9 \leq p_{SF}/p_D \leq 1.05$.



WO 2024/251758 A1