CLAIMS

1. A process for recycling by separating the constituents of aluminized and plastic packaging, cartoned or not, comprising separating the constituents of polyethylene or polypropylene plastic film with aluminum by solubilizing the polymer in a compatible primary solvent, operation performed below the polymer softening temperature and under pressure followed by insolubilization via reduction of temperature, separation of the solvent from the polymer and finally filtration and reuse of the solvent in the step of solubilization, in the following sequence:

A) Feeding of small shreds of film or equivalent in an intermittent way, through the film doser (A**01**), passing through a locking valve (U**01**) at the inlet of the intermittent feeder (B**01**) and from it through another locking valve (U**02**) at the inlet of the continuous feeder (B**01**A);

B) Dosing of a predetermined quantity of film from the intermittent feeder (B**01**) with the valve (U**01**) blocked and the valve (U**02**) open, transferring the film to a continuous feeder (B**01**A); the valve (U**02**) is blocked and the valve (U**01**) is unlocked and film is re-fed from the doser (A**01**) into the intermittent feeder (B**01**), and so on;

C) Film from the continuous feeder (B**01**A) is fed through its internal conveyor thread, concomitant with the solvent inlet, into the suspension tank (B**02**) with the valve (U**02**) blocked, with continuous volumetric feed of solvent through the solvent feeding pump (Z**01**) in a ratio of 8 to 15 parts of solvent to one part of film, so as to cover the entire film content in the suspension tank (B**02**) and formation of a suspension of the polymer/aluminum film in solvent;

D) Feeding of the suspension in the dissolver tank (C**01**) where the suspension is rotated by a profile in the shape of an internal helical pitch and heating at 100 to 105° C. in an indirect way and with greater circulation, agitation and consequent movement for better convection, with a residence time of 2 to 5 seconds;

E) At the end of the dissolution, the liquid stream with the solution of polymer and aluminum in suspension, enters a special screen filter (D**01**) carried by a helical thread, which conducts the aluminum through the filtration operation and separates the concentrated solution;

F) The concentrated solution crosses the walls of the screen maintaining a counter pressure to the fluid in the solution outlets to keep the dissolver tank (C**01**) pressurized and is collected in the concentrated solution tank (F**01**) and the aluminum with residual polymer flows, pushed by the thread of the filter (D**01**), to another contiguous compartment, the residual polymer washing tank (E**01**) and immediately before and after the wall communicating the two compartments, the duct no longer allows passage through its surface and by using different speed the aluminum is driven to the special aluminum output device (G**10**) out of the system;

G) In the residual polymer washer tank (E**01**), filtered and condensed solvent is injected from the solvent tank (X**01**), through the inside of the helical screw thread of the tank (E**01**), to remove residual polymer solution from aluminum and the diluted solution crosses the screen maintaining a counter pressure to the fluid in the solution outlets to maintain pressurized the dissolver tank (C**01**) and is collected in the diluted solution tank (F**02**);

H) The concentrated solution, after reaching the steady state, is collected in the concentrated solution tank (F**01**) and transferred continuously by the concentrated solution pump (Z**02**) for cooling between 50 and 70° C., initially in the heat recovering unit (LM**01**) to yield heat to the filtered and condensed solvent, and additionally to the concentrated solution cooler (L**01**) in order to precipitate and insolubilize the polymer, then to filtrate into the slurry filter (I**01**), from which the filtered solvent is accumulated, together with solvent from the condenser (J**01**) into the solvent tank (X**01**) and returning through the heat recovery unit (LM**01**), the solvent pump (Z**03**), the solvent heater (M**01**) and the shaft of helical thread of the residual polymer washing tank (E**01**);

I) The diluted solution from the washing of the aluminum in the residual polymer washing tank (E**01**) is collected in the diluted solution tank (F**02**) and return to the beginning of the process continuously through the washing solvent feeding pump (Z**01**);

J) The cake after filtration goes to drying in the polymer dryer (H**01**) and the solvent vapors proceed to the condenser (J**01**) and the resulting condensed solvent is mixed with the condensed solvent coming from the aluminum dryer (K**01**);

L) All solvent vapor streams, after condensate, proceed to the solvent tank (X**01**), are reused for washing the aluminum and from there to the beginning of the process;

M) Aluminum is intermittently removed through a special intermittent, rotating and reciprocating vertical opening and closing aluminum output device (G**10**) in order to also keep the pressure inside the dissolver tank (C**01**) and the aluminum from which the polymer was removed is conducted for drying in the dryer (K**01**), the solvent vapors being separated to the condenser (J**01**), where its stream is mixed with the condensed solvent from the polymer dryer (H**01**);

O) Dry aluminum containing small amounts of cellulosic fibers and pieces of unremoved lids, as well as polypropylene tapes, in batch process, are fed into a crusher tank (P**01**), kerosene is added at room temperature and shear crushing is carried out, not only removing the polymer residual, but also loosing all the residual cellulosic fibers;

P) The agitation is then turned off and the aluminum suspension is transferred to the flotation tank (Q**01**), air is sprayed through the device contained in the bottom of the crushing tank (P**01**), occurring the formation of foam which carries fibers and shreds of polypropylene and cellulosic fibers;

Q) This foam is continuously removed by the draining of the supernatant liquid stream, foam passing through a screen basket (R**01**), where the light particulates of polypropylene and fiber will be retained, then returning the kerosene to the tank, by pumping through the recirculation pump (T**01**) to the tank bottom; and

R) The aluminum suspension, after the impurities are eliminated, is drained by a filter (Y**01**), the kerosene is pumped by the return pump (V**01**) and returns to the kerosene tank (O**01**) which will feed the next batch and the aluminum goes for pressing in the press (S**01**) to remove most of the kerosene, which goes to the melting stage, where evaporation of the remainder of retained kerosene takes place.

2. The process according to claim **1**, wherein the insolubilization of the polymer taking place by incorporating a secondary solvent with affinity with the primary solvent, and not solvent of the polymer.

3. The process according to claim **1**, wherein the process is intermittent and realized according to the following steps:

A) Feeding of small shreds of film or equivalent in an intermittent way through the film doser (A**01**), passing through a locking valve (U**01**) at the inlet of the intermittent feeder (B**01**) and from it through another locking valve (U**02**) at the inlet of the suspension tank (B**02**);

B) Once the valve (U**01**) is blocked between the film doser (A**01**) and the intermittent feeder (B**01**), the film is dosed concomitantly with the solvent feed in the suspension tank (B**02**) and with each intermediate tank feed (B**01**), the valve (U**02**) between it and the suspension tank (B**02**) is held closed;

C) Intermittent volumetric feed of concentrated solution through the concentrated solution feeder (N**01**) and washing solvent through the return solvent feeder (N**02**) effected by positive displacement, the first working only until entry into steady state, in a ratio of 8 to 15parts of solvent to one part of film, so as to cover the entire film content in the suspension tank (B**02**) and formation of a suspension of the polymer/aluminum film in solvent;

H) The concentrated solution, after reaching the steady state, is collected in the concentrated solution tank (F**01**) and transferred intermittently by the concentrated solution feeder (N**03**) for cooling between 50 and 70° C., initially in the heat recovery unit (LM**01**) to give heat to the filtered and condensed solvent, and is further cooled in the concentrated solution cooler (L**01**) in order to precipitate and insolubilize the polymer, then goes to filtrate in the slurry filter (I**01**), from which the filtered solvent is accumulated together with solvent coming from the condenser (J**01**) into the solvent tank (X**01**) and returns through the heat recovery unit (LM**01**), through the solvent feeder (N**04**) intermittently, through the solvent heater (M**01**) and by the shaft of the helical thread of the residual polymer washer tank (E**01**); and

I) The diluted solution from the washing of the aluminum in the residual polymer washing tank (E**01**) is collected in the diluted solution tank (F**02**) and returned to the beginning of the process intermittently through the return solvent feeder (N**02**).

4. Equipment, in order to carry out the process for recycling by separating the constituents of aluminized and plastified packaging, cartoned or not, according to claim **1**, wherein film doser (A**01**), volumetric, of the rotary valve type or similar, intermittent

feeder (B**01**) of cylindrical shape and conical bottom, placed between the continuous feeder (B**01**A) and the film doser (A**01**) and with the diaphragm type locking valve (U**01**) at the inlet; Continuous feeder (B**01**A) of cylindrical shape and conical bottom with internal conveyor thread, with diaphragm-type locking valve (U**02**) at the inlet and with tangential solvent feed connection; dissolver tank (C**01**) with cylindrical section and heating jacket, having in its interior, along its vertical section, a fixed helical pitch involving all the circular transverse section; special screening filter (D**01**) conical-shaped, fitted with a conical helical thread adjusted to the wall of the screen and check valve at the outlet to the concentrated solution tank (F**01**) and communicating with the residual polymer washer tank (E**01**) through non-screening duct leading to the other compartment; residual polymer washer tank (E**01**) of screened duct of cylindrical configuration and with a larger cross-section and containing inside it a cylindrical helical thread with perforations on its shaft and check valve at the outlet to the diluted solution tank (F**02**); concentrated solution tank (F**01**); diluted solution tank (F**02**); special aluminum output device (G**10**) rotating and pulsatile with plunger (G**11**) which moves inside a cylindrical jacket (G**12**) with top opening (G**12**A) connecting to the pressurized system, and another bottom opening (G**12**B) located below, said bottom opening (G**12**B) distant from the top opening (G**12**A) by a length a little larger than the height of the top opening and 180 degrees out of the top opening and in communication with external means, the plunger (G**11**) has a cavity (G**11**A) of semi-cylindrical shape with the lower cut inclined at 45 degrees and delimited by three top sealing rings and three other equidistant rings below, situated at a distance a little larger than the corresponding height of the cavity; Polymer dryer (H**01**) of conveyor thread type with indirect heating; aluminum dryer (K**01**) of the conveyor thread type with indirect heating jacket; concentrated solution cooler (L**01**) of the heat exchanger type; continuous pressurized slurry filter (I**01**); solvent tank (X**01**); solvent vapor condenser (J**01**) of the heat exchanger type; heat recovery unit (LM**01**) of the heat exchanger type; Washing solvent feeding pump (Z**01**) of the pump type; Concentrated solution pump (Z**02**); solvent pump (Z**03**); solvent heater (M**01**); kerosene tank (O**01**); aluminum crusher (P**01**), of the cylindrical shear type and with cutting propellers and baffles; flotation tank (Q**01**) of elongated cylindrical shape and with an air spraying device at the bottom of the tank;

screen basket (R**01**); press (S**01**) of the piston type; recirculation pump (T**01**); return pump (V**01**); and a basket-type drain filter (Y**01**).

5. Equipment, in order to carry out the process for recycling by separating the constituents of aluminized and plastified packaging, cartoned or not, in an intermittent way, according to claim **3**, wherein suspension tank (B**02**) has a cylindrical shape with conical bottom positioned between the intermittent feeder (B**01**) and dissolver tank (C**01**); concentrated solution feeder (N**01**) and return solvent feeder (N**02**), both feeder being volumetric of the reciprocating piston type.

6. A process for recycling by separating the constituents of aluminized and plastified packaging, with separation of the constituents of aluminized and plastified packaging where the aluminum is isolated in the form of pigment, according to claim **1**, wherein, filtration and washing of the aluminum with elements having well-closed ceramic pores and executed at the dissolution temperature and the filtrate after cooling undergoing precipitation of the polymer and being conducted to a new filtration with porous element in the slurry filter (I**01**).

7. Equipment, in order to carry out the process for recycling by separating the constituents of aluminized and plastified packaging, where the aluminum is isolated in the form of pigment, according to claim **6**, wherein the filter (I**01**) is ceramic.

8. A process for recycling by separating the constituents of aluminized, plastified and cartoned packaging comprising:

A. Step A: Separation of cellulose from cartoned, aluminized and plastified (ECAP) packaging, in the following sequence:

A.a Shredding of the packages resulting in crushed dirty shreds (RTS);

A.b Washing of the dirty shreds (RTS) with vigorous agitation in water at room temperature and retention of the shreds, separating the water with dirt, which after closed-loop recirculation undergoes filtration and removal of dirt (SRF), returning the recovered water (ARE) for re-use in the washing, and the clean shreds (RTL) with

polymeric composition rich in polymer/aluminum, are removed and led to the disaggregation step;

A.c Disaggregation of the shreds (RTL) by shear action obtaining paper pulp which, as the shaking occurs, disintegrate and the cellulose fibers of smaller size and density than the resulting residue, aided further by the vortex formed by the shaking, pass through the screen where they lose speed resulting in a concentrated residue of polymeric composition rich in polymer/aluminum (RPA), substantially free of cellulose, which is directed to the A.d drying step and the cellulose pulp suspension (PC) passing to the outer side of the screen, decants and is removed from the process and is directed to step A.e;

A.d The residue of polymeric composition rich in polymer/aluminum (RPA) goes to the stage of drying, either indirectly by slightly superheated steam or by saturated steam, or directly by hot air or combustion flue gases and once dried, the residue of polymeric composition rich in polymer/aluminum (RPA) goes to the separation and isolation of aluminum and polymer in step B;

A.e Filtration of the cellulose pulp suspension (PC), where the cellulose pulp (PC) is drained and directed to step A.f and the filtrate, which is cellulose-free filtered water (AFIC), returns to step A.c, constantly recirculating and feeding the disaggregation; And

A.f The cellulose pulp (PC) undergoes partial drying to yield dry cellulose (CES) or is led directly to the step of the production of sheets of paper (FPA) or bleached cellulose (CEB); and

B. Step B: Separation and isolation of aluminum and polymer contained in the residue of the polymeric composition rich in polymer/aluminum (RPA), with the following sequence:

B.a. Dissolution of the residue of polymeric composition rich in polymer/aluminum (RPA) in a solubilizing solvent (SOLV) of the alkanes family of low to medium boiling point in liquid state independently of its boiling point, associated with stirring or movement, operating at 100 to 105° C., below the softening temperature of the polymer, at atmospheric pressure or at pressure higher than atmospheric pressure when the solvent has low boiling point, with concentration of the polymer in the solution during its residence time starting from 2 seconds, with drainage of the polymer-rich concentrated

solution (SPC) which is directed to step B.d. and separating the aluminum sheets impregnated with polymer and solvent (FAIP);

B.b. Washing of impregnated aluminum sheets (FAIP) with dissolving solvent (SOLV) and concomitant drainage for removal of the polymer-rich concentrated solution (SPC) that is directed to the step B.d. and separating the aluminum sheets impregnated with solvent (FATS);

B.c. Washing of the aluminum sheets (FATS) with washing solvent (SL) chosen from low-boiling point alkanes among others the dissolving solvent itself (SOLV), with drainage to remove the polymer-rich concentrated solution (SPC) to the step B.d. and with final separation of the aluminum foil (FA) by drying and evaporation and subsequent condensation of the solvent, which returns as the hot recovered dissolving solvent (SOLVQ) to the dissolution process, step B.a.;

B.d. Separation of the solvent from the polymer is obtained by cooling the solution to 50 to 70° C. and separating the polymer from the polymer-rich concentrated solution (SPC) by hot filtration under pressure of 1.0 to 10 bar, with the concentrated polymer in slurry form (PFP) going to raise the concentration of the slurry through further filtration, step B.e. and the hot recovered dissolving solvent (SOLVQ) going to further dissolution stage, step B.a.;

B.e. Filtration with washing of the slurry (PFP) under pressure, where most of the residual solvent of the hot recovered dissolving solvent (SOLVQ) is exhaust and returns to the process of dissolution, step B.a. and the resulting cake, with characteristic of a crumbled wet powder impregnated with dissolution solvent;

B.f. If the washing solvent (SL) is not the same as the dissolving solvent, the cake is washed with a small volume of washing solvent (SL), chosen from low boiling alkanes, or 96° GL ethanol which will remove large part of the solvent impregnated in the cake, obtaining the blend of solvents (MDS) and the wet polymer powder (PPU) goes to step B.i.,

B.g. Separation of the small volume of blend of solvents (MDS) by distillation with return of the hot recovered dissolving solvent (SOLVQ) from the bottom of the distillation column for a new dissolution, step B.a., the recovered washing solvent (SLR) from the top of the distillation column returns to a new washing;

B.h. If the dissolving solvent has a low boiling temperature, the impregnated cake is already the wet polymer powder (PPU) with no trace of high boiling solvent;

B.i. The wet polymer powder (PPU) is dried and the final dry polymer powder (PPS) product is obtained and the residual solvent vapors are condensed and the hot recovered dissolving solvent (SOLVQ) is returned to a new dissolution, step B.a.

9. The process according to claim **8**, wherein the dissolving solvent (SOLV) has a boiling point preferably above 60° C.

10. The process according to claim **8**, wherein the dissolving solvent is hexane.

11. The process according to claim **8** wherein the dissolving solvent is kerosene or mineral oil.

12. The process according to claim **8**, wherein the dissolution occurs at a temperature from 100 to 105° C.

13. The process according to claim **8**, wherein the washing solvent (SL) is hexane.

14. The process according to claim **8**, wherein the washing solvent (SL) is ethanol 96° GL.

15. An operation process, in order to carry out the step B, contained on the claim **8**, wherein the following equipment:

E.B.a. Dissolution of the Residue of polymeric composition rich in aluminum/polymer (RPA) in an equipment having an inclined trough (CAI) in the form of a ladder with curved lower surface, where the residue (RPA) is fed at the top, in the flow through the trough, total dissolution of the polymer occurs and at the end of the trough the suspension of aluminum in polymer solution falls on a screening conveyor belt (CTL) where the drained solution initially recirculates through the pump of polymer-rich

concentrated solution (BSPC) and through the filter of polymer-rich concentrated solution (FSPC) and at the end draining the polymer-rich concentrated solution (SPC) which is directed to step E.B.d. and separating the aluminum sheets impregnated with polymer and solvent (FAIP);

E.B.b. Washing of the impregnated aluminum sheets (FAIP) on the continuation of the screening conveyor belt (CTL) with a spray of dissolving solvent (SOLV) and concomitant draining of the polymer-rich concentrated solution (SPC) initially by gravity and then by vacuum through the vacuum chamber (CAV) which is directed to the step E.B.d. and separating the aluminum sheets impregnated with solvent (FAIS);

E.B.c. Washing of the aluminum sheets (FAIS) in the continuation of the screening conveyor belt (CTL) with the spray of washing solvent (SL) with draining of the polymer-rich concentrated solution (SPC) initially by gravity and then by vacuum through the vacuum chamber (CAV) which is directed to step E.B.d. and separating the aluminum sheets (FA) which are dried in the lower dryer (SEI) heated by low pressure saturated steam and the impregnated solvent is separated by evaporation and subsequent condensation in the solvent condenser (COS), which returns as the hot recovered dissolving solvent (SOLVQ) to the respective dissolution processes, step E.B.a;

E.B.d. Separation of the polymer solvent from the polymer-rich concentrated solution (SPC) by hot ultrafiltration under pressure of 2 to 10 bar, using a ultrafiltration separator (SU) with the post-cooled polymer in slurry form (PFP) going to the press-filtration, step E.B.e. and the hot recovered dissolution solvent (SOLVQ) going to a new dissolution operation, step E.B.a;

E.B.e. Filtration of the slurry (PFP) that goes to a subsequent filtering by pressing, in a press filter with washing (FPL), where most of the hot recovered dissolving solvent (SOLVQ) is exhausted and returns to the process of dissolution, step E.B.a. and the resulting cake, having the characteristic of a crumbled powder is washed with a small volume of washing solvent (SL), which removes all of the impregnated solvent in the slurry, separately obtaining a small volume of solvent blend (MDS) and wet polymer powder (PPU); and

E.B.f. Separation of the small volume of solvent blend (MDS) by distillation in solvent simple distiller (DSS) with return of hot recovered dissolving solvent (SOLVQ)

from the bottom of the distiller (DSS) to a new dissolution, step E.B.a., the recovered washer solvent (SLR) from the top of the distiller (DSS) is returned to a new washing and the wet polymer powder (PPU) is dried in a polymer dryer (SEPO) and the final dry polymer powder (PPS) is obtained, and the residual solvent vapors are condensed in the solvent condenser (COS) and the hot recovered dissolving solvent (SOLVQ) is returned to a new dissolution, step E.B.a.

16. An operation process, in order to carry out the step B.a., contained in claim **8**, wherein, first alternative, the following equipment:

E.B.a.1. Immersion of the Residue of polymeric composition rich in aluminum/polymer in a dissolving solvent (SOLV) in a screening conveyor belt (CTL), with stirring by means of moving jets of recirculating solvent through a bottom solution filter (FSPC) and a bottom solution recirculating pump (BSPC) with concentration of the polymer in the solution during its residence time, with drainage through the sieve, by gravity of the polymer-rich concentrated solution (SPC), letting the aluminum sheets impregnated with polymer and solvent (FAIP) to emerge from the solution, being said aluminum sheets retained and isolated on the screening conveyor belt (CTL).

17. An operation process, in order to carry out the step B.a., contained in claim **8**, wherein, second alternative, the following equipment:

E.B.a.2. Dissolution of the Residue of polymeric composition rich in aluminum/polymer (RPA) with a dissolving solvent (SOLV) in a Hildebrand extractor (EH), with draining by gravity of the polymer-rich concentrated solution (SPC), letting the aluminum sheets be impregnated with polymer and solvent (FAIP) as they emerge from the solution.

18. An operation process, in order to carry out the step B.d., contained in claim **8**, wherein, in its alternative form, the following equipment:

E.B.d.1. Separation of the solvent from the polymer is obtained by cooling the solution in a heat exchanger (RSTC) and by filtration in a press filter (FFP) and which is reheated in the solvent heater (AQS).

19. An operation process, in order to carry out the complete process of separating the aluminum in its alternative form, through the steps E.B. and E.C., according to claim **8**, wherein, the following equipment: B. Step B. Obtaining of aluminum film (FIA) separated from the polymer-rich solution (SPC):

E.B.A. Positioning of the residue of polymeric composition rich in aluminum/polymer (RPA) and contained in a perforated basket (CP) inside a dissolution tank (TQD) so that in its position inside the vessel it does not touch the bottom of the vessel, hold on supports in the wall and then the tank is closed; The tank (TQD) has two different heating systems, both fed with saturated steam: the first system consists of a thermosiphon (TSF); and the second system with a steam jacket at the bottom of the tank; it is connected to a reflux condenser (CR) having control of temperature, pressure and water flow in the reflux condenser and has a bottom valve;

E.B.B. Transfer of the dissolving solvent (SOLV) with temperature in the range of 100-105° C. from the solvent tank (TS) to the dissolution tank (TQD) until fully cover the residue of polymeric composition rich in aluminum/polymer (RPA) contained in the basket (CP) and the dissolution of the polymer-rich polymeric composition is initiated, by feeding steam in the thermosiphon (TSF) connected to the dissolution tank (TQD), occurring the heating and vaporization of the solvent inside the tube bundle, and consequently, displaces a liquid column responsible for the upward displacement of the liquid solvent and its circulation through the shreds of the residue of polymeric composition rich in polymer/aluminum returning to the bottom and re-feeding the tube bundle; The circulation is maintained for 1 to 5 minutes when occurs the partial evaporation of the solvent that is condensed in the reflux condenser (CR) returning to the tank and at the end the polymer-rich concentrated solution (SPC) is drained by the bottom valve, passing through the in-line filter (FL) to the solvent condenser tank (TCS) and goes to the step E.B.F;

E.B.C. Solvent from the solvent tank (TS) is again transferred to the dissolution tank (TQD) on a level below the bottom of the basket (CP) and the washing is started, now feeding steam to the jacket of the dissolution tank, occurring heating of the solvent contained in the bottom of the vessel, and rising of the vapors, passing through the basket, proceeding to the reflux condenser (CR), said operation being kept at the pressure

corresponding to the dissolution temperature and the solvent condensate being kept at a temperature slightly below the saturation temperature percolating through the contents of the basket and which, upon coming into contact with the upward stream of vapors, absorbs heat in a way that, being hot, and on flowing down upon the shreds, wash the residue of solution of polymeric composition rich in polymer that still cover the aluminum, said solution being then transferred to the space below the base of the basket, obtaining complete and continuous washing of aluminum and finally is transferred, with help of internal pressure, the diluted polymer-rich solution (SPD), through the valve at the side of the tank (TQD), to the diluted solution tank (TSD) containing its own reflux condenser, positioned above the tank (TQD) which will feed a new residue of polymeric composition rich in polymer/aluminum, complemented by new or recovered solvent;

E.B.D. Once all liquid solvent has been transferred from the dissolution tank (TQD), after washing, and the bottom outlet of the dissolution tank (TQD) being closed, the vacuum is initially drawn through a vacuum system (SV) which directs the vapor to the reflux condenser (CR) and from there to the atmosphere, and keeping the tank heated with steam in the jacket and then to a purge operation of the residual vapors contained in the dissolution tank, which are drawn by a stream of nitrogen for purge (NPP) to the reflux condenser (CR) and from the condenser to the atmosphere;

E.B.E. After, the dissolution tank (TQD) is opened, the basket (CP) is withdrawn and after removal of the aluminum film (FIA) pieces free from polymer-rich polymeric composition, returns to step E.A.b. and the recovered aluminum is directed to processing in a melting and casting furnace or other stage;

E.B.F. The Polymer-rich concentrated solution (SPC) contained in the condenser tank (TCS) is subjected to heating in order to distil part of the solvent and the vapors are passed to the reflux condenser (CRS) which transfers the hot recovered dissolving solvent (SOLVQ) to the solvent stock tank (TES) which feeds the dissolution tank (TQD) to give the resulting solution (SR) containing polymer-rich polymeric composition with higher viscosity and can then be sent to step E.B.G. or to steps C.1.a., C.2.a., C.3.a., C.4.a. or C.5.a; and

E.B.G. The resulting solution (SR) containing polymer-rich polymeric composition with higher viscosity, from which the solvent was partially removed, is subjected to

dragging by saturated steam (VAS), which is performed at a temperature close to the softening temperature of the polymer-rich polymeric composition and employing in this operation direct saturated steam and indirect steam with temperature of the steam injected into the jacket of the tank (TCS) kept close to that of the injected saturated steam; the vapor stream from this operation flows to a condenser where the condensed water is drained and the solvent vapors exit at the top of this first condenser (CD1), passes to a second condenser (CD2) where condensation of the solvent occurs, flowing, still hot, to the solvent stock tank (TES) which refeed the dissolution tank (TQD) with hot recovered dissolution solvent (SOLVQ); This step has its solvent elimination control adjusted to different processes for recovery of the polymer-rich polymeric solution (SPC), according to its final form; in the form of film, powder or pellets.

20. The process according to claim **19**, wherein, realization of step E.C., in its alternative form, using the following equipment:

C.1 In the form of precipitate

E.C.1.a. The resulting solution (SR) containing polymer-rich polymeric composition with higher viscosity is cooled and precipitated in ethanol (AE) under agitation and with indirect cooling in precipitation tank (TPP);

E.C.1.b. The precipitated polymer is filtered through a filter (FIL), separating the obtained powder, then is transferred to a tank with water (TA) where will occur the elimination of the solvents;

E.C.1.c. The solvent is removed using direct heating with steam (VA), the dragged solvent vapors are directed to a condenser (COND) and then to a decantation tank (TDE) to proceed to the separation of the immiscible phase and the supernatant solvent;

E.C.1.d. The aqueous phase is subjected to distillation to separate recovered ethanol (AER) dissolved therein in ethanol distiller (DESA), and the organic phase, which contains a greater quantity of the dissolving solvent is further distilled in the dissolving solvent distiller (DESH), recovering from this mixture the dissolving solvent (SOLVQ) and also a little of ethanol partitioned and in equilibrium with the dissolving solvent in a phase equilibrium; and

E.C.1.e. The resulting polymer is filtered in the filter (FIL) and dried in a conventional dryer (SEC) to give the dry precipitated polymer (PPS).