Claims

1. Use of a separation fluid (330) for separating multilayer systems (10) comprising at least a metal layer (30) and a polymer layer (20, 40), the separation fluid (330) comprising a mixture of water, a water miscible C1-C4 monocarboxylic acid, phosphoric acid and an alkali metal hydroxide.

2. The use of claim 1, wherein the water miscible C1-C4 monocarboxylic acid, phosphoric acid and alkali metal hydroxide react partially in solution to form alkali metal phosphate and alkali metal carboxylates.

3. The use of claim 1 or 2, wherein the water miscible C1-C4 monocarboxylic acid is selected from the group consisting of formic acid, acetic acid, propionic acid or butyric acid.

4. The use of any one of the above claims, wherein the alkali metal hydroxide is selected from the group consisting of lithium hydroxide, sodium hydroxide or potassium hydroxide.

5. The use of any of the above claims, wherein components of the mixture comprise 30 – 60 % by weight of water miscible C1-C4 monocarboxylic acid, 0.5 – 5 % by weight of phosphoric acid (30 % solution) and 2 – 8 % by weight of alkali metal hydroxide (33 % solution), and 30 – 60 % by weight of water.

6. The use of any of the above claims, wherein components of the mixture comprise 42 – 48 % by weight of water miscible C1-C4 monocarboxylic acid, 2 – 4 % by weight of phosphoric acid (30 % solution) and 4 – 8 % by weight of alkali metal hydroxide (33 % solution), and 45 – 50 % by weight of water.

7. A method for the separation of a metal layer (30) from a polymer layer (20, 40) in a multilayer material (10) comprising:
placing the multilayer material (10) in a vat (310) comprising the separation fluid

(330), wherein the separation fluid comprises a mixture of water, a water miscible C1-C4 monocarboxylic acid, phosphoric acid and an alkali metal hydroxide.

8. The method of claim 7, further comprising at least one of sieving or filtering (240) the separation fluid (330) with components of the multilayer material (10) and thereafter sorting (260, 280) to obtain a first fraction of metal from the metal layer (30) and a second fraction of plastic from the polymer layer (20, 40).

9. The method of claim 7 or 8, further comprising recycling of the separation fluid (330).

10. The method of one of claims 7 to 9, wherein the separation is carried out at a temperature of between 20°C and 90°C.

11. The method of one of claims 7 to 10, wherein the separation is carried out at a temperature of 70°C.

12. The method of any one of claims 7 to 11, wherein the separation fluid has a pH value of between 2 and 4.

13. The method of any one of claims 7 to 12, wherein the multilayer material (10) comprises at least one aluminium layer and one polymer layer (20, 40) consisting of PET or PE.

14. The method of any one of claims 7 or 12, wherein the metal layer (30) is from aluminium or an alloy thereof.

15. The method of any one of claims 7 to 12, wherein the at least one polymer layer (20, 40) is made of a polyolefin.

16. An apparatus for the recycling of packaging material made from a multilayer material (10) comprising at least a metal layer (30) and a polymer layer (20, 40), the apparatus using the method of at least one of claims 7 to 15, wherein the apparatus comprises

a vat (310) having a separation fluid (330) comprising a mixture of water, a water miscible C1-C4 monocarboxylic acid, phosphoric acid and an alkali metal hydroxide;

a transportation device for transporting the multilayer material (10) into the vat (310); and

a sieving/filtration device (350) for removing (240) separated materials from the combination of the separation fluid (330) and the multilayer material (10).