CLAIMS

1. A method for separating at least one catalyst from a mixture of homogeneously shaped catalysts, the catalysts comprising at least one metal selected from the group formed by Ni, Co, Mo, W, the catalyst to be separated comprising a characteristic metal selected from the group formed by Ni, Co, Mo, W and the other catalysts of the mixture not containing said characteristic metal, in which method:
   - the grains of the catalyst of said mixture pass in front of the LIBS detection system,
   - the presence of said characteristic metal in the catalysts is detected by the LIBS technique, the wavelength being selected so as to detect said characteristic metal,
   - the LIBS detection system sends a signal to a means for evacuating grains of catalyst to be separated in a manner such as to separate said grains from the other catalysts of said mixture.
2. The method according to claim 1, in which the catalyst to be separated contains tungsten as the characteristic metal, the other catalysts of the mixture being devoid of tungsten and said other catalysts containing at least one metal selected from the group formed by Ni, Co, Mo.
3. The method according to one of the preceding claims, in which the catalyst to be separated contains tungsten as the characteristic metal, the other catalysts of the mixture being devoid of tungsten and at least one of said other catalysts containing molybdenum.
4. The method according to one of the preceding claims, in which the catalyst to be separated contains W as the characteristic metal and also contains Ni, the other catalysts of the mixture contain NiMo or CoMo or NiCoMo and are devoid of W.
5. The method according to one of the preceding claims, in which the catalysts of the mixture are hydrotreatment and/or hydrocracking catalysts.

6. The method according to one of the preceding claims, in which the catalysts are spent hydrotreatment and/or hydrocracking catalysts the support of which is constituted by alumina or silica-alumina, with zeolite optionally being present.

7. The method according to one of the preceding claims, in which the catalysts are homogeneously shaped, preferably in the form of cylindrical extrudates, beads, trilobes or multilobes.

8. The method according to one of the preceding claims, in which the catalysts of the mixture are in the form of cylindrical extrudates.

9. The method according to one of the preceding claims, in which the catalysts of the mixture are spent catalysts.

10. The method according to one of the preceding claims in which the time period for one grain to pass in front of the LIBS detection system is less than 50 ms, preferably less than 10 ms.

11. The method according to one of the preceding claims, in which the maximum spacing between the grains is equal to their largest characteristic dimension.

12. The method according to one of the preceding claims, in which the grains, preferably cylindrical extrudates, flow in a manner such that they are spaced apart by a distance in the range from zero to their largest characteristic dimension, the measurement frequency being in the range 1/t to 1/2t, t being the period of time for a grain to pass in front of the LIBS detection system.

13. The method according to one of the preceding claims, in which the detection system is positioned in a manner such that the depth of the analysis field above the surface of the transport means is in the range 1/3 to 3 times the smallest characteristic dimension of the grain.

14. A device for separating at least one catalyst from a mixture of homogeneously shaped catalysts, the catalyst to be separated comprising a characteristic metal selected from the group formed by Ni, Co, Mo and W and the other catalysts of the mixture not containing said characteristic metal, said device comprising:

- a line for transporting the mixture of catalysts, provided with a ribbed belt, an inclined vibrating plate for controlling the rate of flow of the grains onto the ribbed belt and a computer for controlling its speed, said inclined vibrating plate being regulated in a manner such that the maximum distance between the grains is equal to the largest characteristic dimension of a grain and in that the period of time for a grain to pass in front of the LIBS detection means is less than 50 ms, preferably less than 10 ms,
- a LIBS detection system comprising at least one laser in front of which the grains pass, the detection time being less than 50 ms, preferably less than 10 ms, and the wavelength being that of the characteristic metal, at least one analyser (8) and at least one computer (10),
- at least one valve for evacuating grains of catalyst to be separated and at least one valve for evacuating grains of the other catalysts, said valve being actuated from said computer when the characteristic metal is detected.

15. The device according to claim 14, in which the depth of the ribs in the ribbed belt is in the range 0.7 to 1.3 times the largest characteristic dimension of the grains.

16. The device according to claim 14 or claim 15, in which the grains flow in a manner such that their spacing is in the range from zero to their largest characteristic dimension, the measurement frequency being in the range 1/t to 1/2t, t being the period of time for a grain to pass in front of the LIBS detection system, and the grains preferably being extrudates.