CLAIMS

1. A method for determining the concentration of particles of carbon or of dehydrogenated asphaltenes in an oily fluid opaque to light radiations in the visible range, characterized in that a sample of fluid is subjected to infrared (IR) light irradiation and the radiation exiting the irradiated sample is reprocessed by an optically reading device into a signal correlated to the concentration of said particles, wherein the sample of opaque oily fluid, subjected to IR irradiation, is placed on a support transparent to IR radiation, in the form of layer of a thickness of 0.05 to 3 mm, and wherein said device carries out a counting of said particles on plural focal planes, whereby a three-dimensional reading is obtained.
2. The method according to ~~any one of the preceding~~ claims 1, wherein the signal is correlated with particle concentration expressed as number of particles over residue volume (n/v or n/ml), as number of particles over weight (n/w or n/g), as percentage of total particle area over field area (%), as particle volume over sample weight (v/w or µl/g or l/kg), as percentage of particle volume over volume of residue sample analyzed (%).
3. The method according to any one of the preceding claims, wherein the opaque oily fluid is the bottom residue (tar) of a petroliferous thermal conversion and/or catalytic process.
4. The method according to any one of the preceding claims, wherein the sample of opaque oily fluid is subjected to IR irradiation in a non-diluted form.
5. The method according to any one of the preceding claims, wherein the determining of the concentration of particles of carbon or of dehydrogenated asphaltenes is carried out with the conversion process under way.
6. The method according to any one of the preceding claims, wherein the sample is analyzed with an IR microscope.
7. The method according to claim 6~~8~~, wherein said microscope has an IR light polarizer, and comprising an additional step of reading the carbonaceous mesophase.

8. An apparatus for determining the concentration of particles of carbon or of dehydrogenated asphaltenes in an oily fluid opaque to light radiations in the visible range, comprising an IR light source focusable on the sample to be analyzed, the IR light being able to pass through a sample of a thickness of 0.05 to 3 mm, means for counting of said particles on plural focal planes, means for receiving the radiation exiting the sample, means for transforming the exiting radiation into a signal correlated to the concentration of particles present in the sample.

9. The apparatus according to claim 8~~10~~, comprising the following elements: an automatic sampler, a reading chamber, a signal reprocessing unit, or, alternatively, a signal reprocessing and transfer unit.

10. The apparatus according to claims 8~~10~~ or 9~~11~~ wherein the reading chamber comprises an IR optical microscope.

11. The apparatus according to claim 10~~2~~ , wherein said IR optical microscope comprises an IR light polarizer.

12. The apparatus according to claim 11~~3~~ , wherein said microscope can carry out readings on different overlapped focal planes, whereby a three-dimensional reading is obtained.

13. The apparatus according to any one of the claims 8~~10~~ to 12~~4~~, wherein the signal reprocessing unit is a chamber coupled to a monitor for representing the image of the analyzed sample.

14. The apparatus according to any one of the claims 8~~10~~ to 13~~5~~, comprising a thermostating chamber upstream of the reading chamber, and optionally means for removing the sample from the reading chamber.

15. The apparatus according to any one of the claims 8~~10~~ to 14~~6~~, integrated into the thermal conversion plant via a bypass from the plant line.

16. A method of adjusting the operating conditions of a petroliferous thermal or catalytic conversion plant, comprising the following steps:

determining the concentration of particles of carbon or of dehydrogenated asphaltenes present in the bottom residue of the plant by subjecting a sample of the residue to infrared (IR) light irradiation, wherein the sample is placed on a

support transparent to IR radiation, in the form of layer of a thickness of 0.05 to 3 mm;

converting the radiation exiting the irradiated sample into a signal (CV/IR parameter) correlated to the concentration of said particles,

characterized in that the operating conditions of the plant are corrected in accordance with the CV/IR value determined.

17. The method according to claim 16~~8~~, characterized in that when the CV/IR parameter detects a carbonaceous charge higher than a preset limit threshold, either a decrease of the furnace temperature or an increase of the amount of stabilizing additives in the plant charge will be operated, in order to obtain a decrease of the fouling potential of the plant.

18. The method according to claim 17~~9~~, characterized in that when the CV/IR parameter detects a carbonaceous charge lower than a maximum acceptable threshold, an increase of the furnace temperature will be operated, with the entailed increase of light distilled fractions.

19. The method according to any one of the claims 16~~9~~ to 18~~20~~, wherein the signal correlated to the concentration of the particles of carbon or of dehydrogenated asphaltenes in the sample automatically triggers a series of operations correcting the operating conditions of the plant.

20. The method according to any one of the claims 16 to 19~~ to 21~~, wherein the sample of residue analyzed is in non-diluted form.

21. The method according to any one of the claims 16~~9~~ to 20~~2~~, wherein the determining of the concentration of particles of carbon or of dehydrogenated asphaltenes in the sample of residue and the correcting of the conditions are carried out with the plant during operation and in real time.