**Pyrolysis of oil sludge from the offshore petroleum industry: influence of different mesoporous zeolites catalysts to obtain paraffinic products**

Jônatas V. Milato1\*, Rodrigo José França1 and Mônica R. C. Marques1

1Chemistry Institute, State University of Rio de Janeiro (UERJ), Rio de Janeiro, 20550-900, Brazil.

**\***Correspondence: [jonatasmilato@gmail.com](mailto:jonatasmilato@gmail.com); Tel.: +55 21 9 9929-3676

# APPENDIX A. SUPPLEMENTARY DATA

**(a)**

**(b)**

Fig. S1. FT-IR spectrum (a) and TG and DTG analysis (b) of the samples of Dry Oil Sludge.



**(b)**

**(a)**



Fig. S2. GC-MS total ion chromatogram of standard diesel – CENPES/PETROBRAS (a) and standard paraffinic BPCS – Agilent Technologies (b)

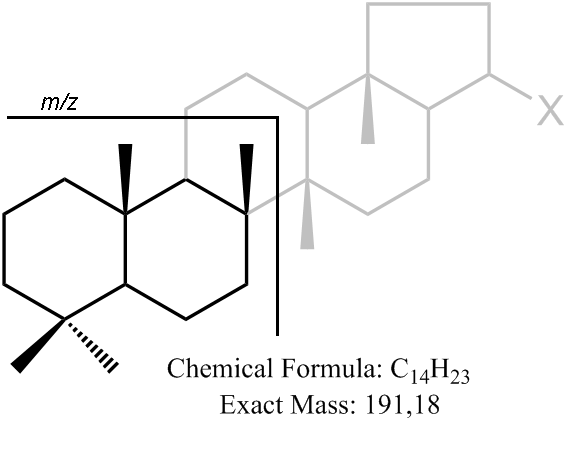






Fig. S3. m/z 77, 85 and 191 to determined aromatic, linear and cyclic yield respectively

**(c)**

**(b)**

**(a)**

**Fig. S4.** TG and DTG curves of the zeolites CBV-720 (a), CBV-760 (b) and CBV-780 (c)



**Table S1. The mass balance of pyrolysis products**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | % Solid |  | % Liquid |  | % Gas |  |
| DS-Thermal (a) | 33 |  | 59 |  | 8 |  |
| DS-720 (b) | 38 |  | 47 |  | 15 |  |
| DS-760 (c) | 36 |  | 54 |  | 10 |  |
| DS-780 (d) | 37 |  | 58 |  | 5 |  |
|  |  |  |  |  |  |  |

**Table S2. Light and Heavy Hydrocarbons of pyrolytic oil - dry sludge**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | HC Light |  | HC Heavy |  |
|  | % |  | % |  |
| Crude Sludge | 21.0 |  | 79.0 |  |
| DS-Thermal | 39.5 |  | 60.5 |  |
| DS-720 | 61.5 |  | 38.5 |  |
| DS-760 | 66.0 |  | 34.0 |  |
| DS-780 | 96.0 |  | 4.0 |  |

**Table S3. Chemical profile of the pyrolytic oil by pyrolysis of dry sludge**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | % Aromatic |  | % Paraffinic |  | % Cyclics |  |
| Light HC | | | | | | |
| Crude Sludge | 40 |  | 50 |  | 10 |  |
| DS-Thermal | 29.5 |  | 58.5 |  | 11 |  |
| DS-720 | 26 |  | 55.5 |  | 18 |  |
| DS-760 | 33.5 |  | 58.5 |  | 8 |  |
| DS-780 | 28 |  | 66 |  | 6 |  |
| Heavy HC | | | | | | |
| Crude Sludge | 15 |  | 66 |  | 18 |  |
| DS-Thermal | 13 |  | 72 |  | 14.5 |  |
| DS-720 | 12 |  | 74 |  | 14 |  |
| DS-760 | 12 |  | 75 |  | 13.5 |  |
| DS-780 | 9.5 |  | 79 |  | 12.5 |  |