***Comparative between Newly prepared Copolymers with Their Nano-composits as Flow Improver for Lubricating Oil***

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**Abstract:**

Lubricating oil is an essential product of energy so the goal of this work is modifying the petroleum lubricating oil. In this work the copolymers (CPs); hexadecylmethacrylate-dodecene (CP1) and hexadecylmethacrylate-hexadecene (CP2) was laboratoryly synthesized through solution polymerization of the synthesized ester of hexadecylmethacrylate with 1-dodecene or 1-hexadecene. The nano-composite of these polymers NCPs; hexadecylmethacrylate-dodecene-NMMT (NCP1) and hexadecylmethacrylate-hexadecene-NMMT (NCP2) was synthesized through the emulsion polymerization of the same reactants of the prepared CPs with adding the nano-montmorolonite. FTIR and 1HNMR was achieved to prove the success preparation CPs and NCPs, TGA to prove the thermal stability of these polymers also TEM and DLS was achieved for the nanocomposite polymers. The prepared polymers were applied as pour-point-depressant (PPD), flow-improver (FI), a lubricating oil viscosity modifier (VM) to show high efficiency of all polymers, then the results was compared between the CPs and NCPs for proving the modification of the nanocompsites at all the results. The pour-point was depressed from 0 oC (blank) to -15, -21, -21 and -27 oC for CP1, CP2, NCP1 and NCP2 respectively at 10,000 ppm of them. The viscosity-index elevated from 86.57 (blank) to 89.31, 90.87, 91.02 and 92.47 for CP1, CP2, NCP1 and NCP2 respectively.

***Keywords:*** *Copolymers, Montmorillonite, lubricating oil, pour-point depressant, rheology and flow improver*.

**Biography of Presenter:**

* **Researcher** at Applications Department, Egyptian Petroleum Research Institute.
* **PhD in Organic chemistry in 2020 in** "Synthesis of Some Terpolymer Nanocomposites and Their Evaluation as Additives for Some Petroleum Products"**.**
* **Some of publications;** Comparative study between Copolymer based on oleic acid and its nanohybrid for improving the cold flow properties of diesel fuel **(2023),** [Evaluation of newly copolymers and their montmorillonite nanocomposite as cold flow improver for petroleum lubricating oil](https://scholar.google.com/citations?view_op=view_citation&hl=en&user=yiL8O4EAAAAJ&citation_for_view=yiL8O4EAAAAJ:2osOgNQ5qMEC) **(2023)** andComparison between Schiff-base and its iron complex as steel corrosion inhibitors used by the petroleum industry in marine environments **(2023)**
* **Reviewer** at many journals**.**
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