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Kanj et al.

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(54) **CARBON-BASED FLUORESCENT TRACERS AS OIL RESERVOIR NANO-AGENTS**

(52) **U.S. Cl.**
CPC *C09K 11/06* (2013.01); *B82Y 20/00* (2013.01); *C01B 32/15* (2017.08); *C07C 215/08* (2013.01);

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(Continued)

(58) **Field of Classification Search**
None
See application file for complete search history.

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 8 days.

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This patent is subject to a terminal disclaimer.

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Baker, S.N. and Baker, G.A., Luminescent Carbon Nanodots: Emergent Nanolights, *Angewandte Chemie*, (2010), pp. 6726-6744, vol. 49, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, www.angewandte.org.

(65) **Prior Publication Data**

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Related U.S. Application Data

(57) **ABSTRACT**

(60) Continuation of application No. 14/627,404, filed on Feb. 20, 2015, now Pat. No. 9,528,045, which is a (Continued)

The present invention relates to carbon-based fluorescent nano-agent tracers for analysis of oil reservoirs. The carbon-based fluorescent nano-agents may be used in the analysis of the porosity of a formation. The nanoagents are suitable for injection into a petroleum reservoir and may be recovered from the reservoir for the determination of hydrocarbon flow rates and retention times.

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14 Claims, 13 Drawing Sheets

