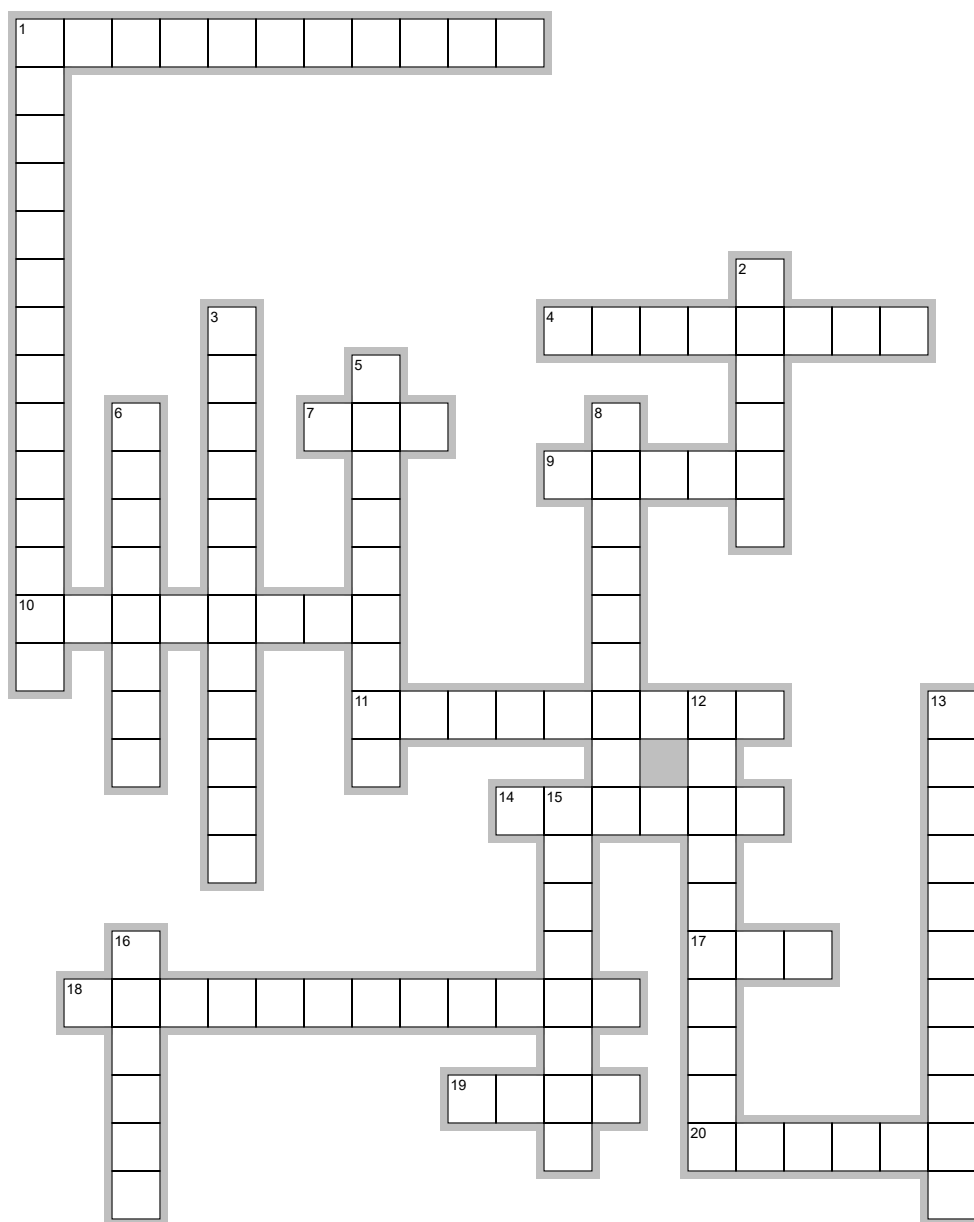


# Petroleum engineering-themed crossword puzzle #12

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EclipseCrossword.com

## Across

1. changes in oil \_\_\_\_\_ can lead to asphaltene precipitation
4. Heteroatom in crude oil that can form basic compounds
7. Laboratory instrument combining thin-layer chromatography with flame ionization detection
9. High-energy technique that can break large molecules into ions for analysis of molecular weight
10. The most abundant element in crude oil by count of atoms
11. Hydrocarbon fraction containing one or more benzene rings
14. Polar, heavy oil fraction that can stabilize asphaltenes; adsorbs on asphaltene surfaces
17. Method that identifies molecular structure by observing nuclear spin in a magnetic field
18. Process of heating crude oil to boiling and condensing fractions to determine its boiling range
19. Analytical method (abbr.) using infrared light to determine functional groups in asphaltenes
20. Undesirable element in crude oil that contributes to acidity and corrodes equipment

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## Down

1. Laboratory technique for separating mixture components by passing them through a medium
2. Crude oil or natural gas in their unrefined form are examples of \_\_\_\_\_ fuels
3. Analytical technique involving the interaction of electromagnetic radiation with matter
5. Analysis determining the percentages of C, H, S, N, etc., in an oil sample
6. Metal that often appears in heavy crude and asphaltenes, detectable by ICP analysis
8. A fraction of crude oil with no double bonds or aromatics
12. Flow assurance seeks to maintain \_\_\_\_\_ production of oil and gas
13. Degree of hotness or coldness; a drop in this (along with pressure changes) can destabilize asphaltenes
15. Heavy asphaltene deposition can lead to operations that are far from \_\_\_\_\_
16. A transition metal frequently found in asphaltene fractions of crude