

Common Liptinitic Constituents of Mukalla Coals in The Offshore Qamar Basin, Eastern Yemen: Implication for Hydrocarbon

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Qamar Basin is a petroliferous Mesozoic basin in Eastern Yemen. The origin of the hydrocarbons in the basin is not fully understood. The Qamar Basin is dominated by a thick Mesozoic and Cenozoic sedimentary sequence, but wells have not penetrated deeper than the Upper Cretaceous Mukalla Formation in the offshore Qamar Basin. The Mukalla Formation is composed of sandstones, organic-rich shales and coal seams. However, published data related to geochemical and petrographic characteristics of the Mukalla coals are very limited. To rectify this, the Mukalla coal deposits of offshore Qamar Basin, selected from three exploration wells, have been evaluated in this study. This presentation will identify and describe the type of common liptinitic constituents of the Mukalla coals and their relation to hydrocarbon generation potential. The Mukalla coal samples analysed range in maturity from 0.65 to 0.85 %. They are characterised by a high total organic matter content (36-80 wt. %) and possess excellent hydrocarbon generating potential. Kerogen typing carried out on whole rock samples revealed that the Mukalla coal samples consist predominantly of type III vitrinitic kerogen and type II liptinitic kerogen. Vitrinite is the most abundant maceral in the studied coal samples of the Mukalla Formation. All coal samples of the Mukalla Formation, however, contain significant amount of liptinitic macerals particularly sporinite, suberinite, resinite, liptodetrinite, cutinite and exsudatinitite (Fig.1). These macerals are dominant type II

kerogen within the studied samples. The kerogen type was also characterised by Rock-Eval pyrolysis analysis. The Mukalla coals contain predominantly a mixture of type II-III kerogen with minor contributions from type II and type III (Fig. 2). This is indicated by hydrogen index values that range from 130 to 410 mg HC/g TOC, thus in support of the kerogen types as were identified based on petrographic method. A number of petrographic features in the Mukalla coals are commonly considered to indicate oil generation were observed. Such features include the occurrence of exsudatinitite and oil haze. The development of exsudatinitite that displays intense yellow-orange fluorescence in the Mukalla coals is taken to represent a peak mature stage of liquid hydrocarbon generation which takes place at about 0.85 % Ro. This falls within the generally considered "peak oil window" that commonly occurs within 0.6-0.9% vitrinite reflectance values).

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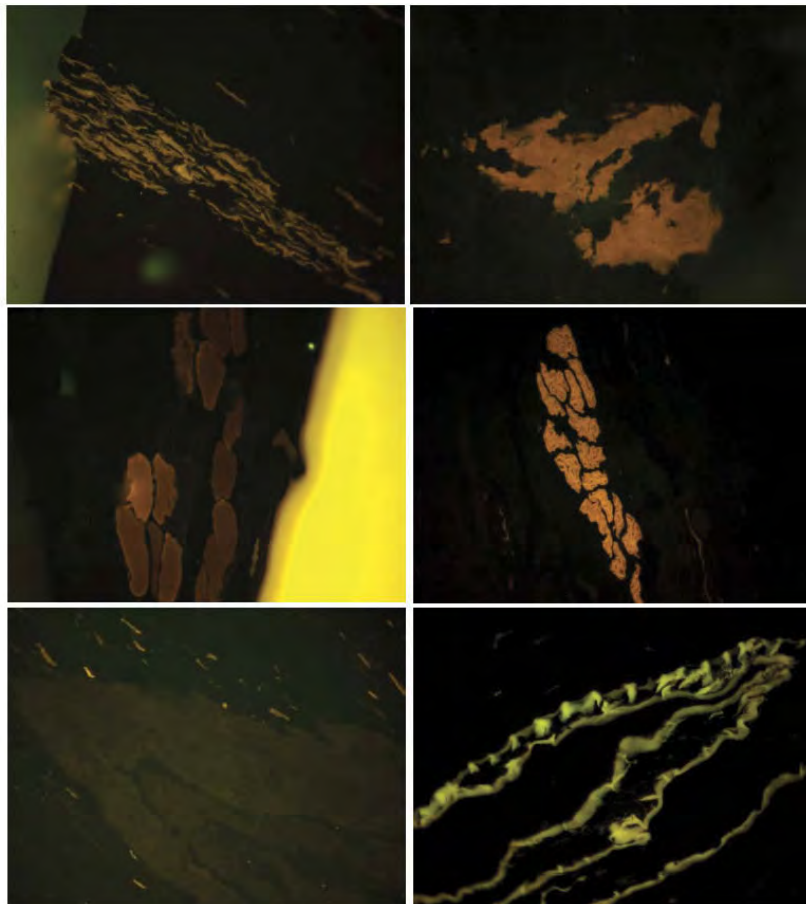


Figure 1: Photomicrographs of macerals from Upper Cretaceous Mukalla coals, offshore Qamar Basin, Eastern Yemen.