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## Dielectric properties of Jordanian oil shales

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**Abstract:** Microwave heating has been suggested by various authors as a suitable technology for extraction of organic material from oil shales. However, one of the limiting factors in the development of this technology is a lack of accurate dielectric property data for design purposes. In this study the dielectric behaviour of El-lajun oil shale is quantified. The dielectric constant and loss factor of El-lajun oil shale were measured at 2470 and 912 MHz using the cavity perturbation technique. The effects of organic content, temperature, and moisture content on the microwave heating efficiency were quantified. Coaxial probe technique was also employed to study the effect of frequency on dielectric properties of oil shale. Generally, it was found that all samples were of low dielectric loss at room temperature with the imaginary part of permittivity falling significantly after the moisture was removed. This suggests that the major contribution in the dielectric loss is due to the presence of free and/or interlayer water. It was found that both the real and imaginary part of complex permittivity increased with a rise in temperature from 20 up to 80 °C, then dropped significantly at about 100 °C before staying approximately constant up to a temperature of about 480 °C. From this temperature both the real and imaginary parts of complex permittivity increased sharply with further increase in temperature. An attempt was also made to correlate the dielectric properties of the bulk shale sample with the organic content. However, no correlation between dielectric properties and organic matter content was found.