Abstracts

Online Measurements of the Fast Changing Dielectric Constant in Oil Shale Due to High-Power Microwave Heating

C.-L.J. Hu. "Online Measurements of the Fast Changing Dielectric Constant in Oil Shale Due to High-Power Microwave Heating." 1979 Transactions on Microwave Theory and Techniques 27.1 (Jan. 1979 [T-MTT]): 38-43.

The change of the complex dielectric constant epsilon of off shale under intensive microwave heating is an abrupt phenomenon which is quite different from that due to conventional heating. Based on the principle of competitive chemical kinetics, a theory is proposed here for explaining this rapid change of the dielectric constant. A mathematical analysis of a coaxial waveguide loaded with oil-shale blocks which has a fast changing epsilon with respect to time is carried out in detail, from which an online measuring technique is derived for measuring this fast changing epsilon with respect to time and temperature. Preliminary experimental results show that the proposed theory is suitable for explaining this fast changing phenomenon. The online measuring technique reported here is very similar to the three-probe or five-port measuring methods reported in the literature, except that it is more general compared to some of these methods. Its designing approach is also different because it is derived from a modfied phasor analysis with the physical picture easily visualized.

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