

ALTERNATIVE MODELS FOR OPTICAL PROPERTIES OF A HIGHLY-POROUS MEDIUM COMPOSED OF WOOD CHIPS

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ABSTRACT. The highly-porous layer of oakwood chips is used as a relatively pure reference material in laboratory studies of heating, drying and pyrolysis of organic waste. The general computational model for thermo-chemical processes accompanying the industrial production of a synthesis gas and bio-diesel fuels includes thermal radiation, which is one of the important heat transfer modes. Therefore, a relatively simple model for spectral optical properties of a medium composed of wood chips is desirable to avoid time-consuming calculations. Such a model based on analytical solution for diffusely irradiated wood plates is suggested in the paper. A comparison with direct numerical simulation of radiative transfer confirms good accuracy of the model. A similar approach can be recommended to estimate optical properties of other semi-transparent disperse systems containing randomly oriented large particles.