
Remote laser four-wave method for measuring thickness of the thin petrochemical films on the rough sea surface

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The urgent problem of monitoring oil pollution on water surface is considered. Laser spectrophotometric method for measuring thickness of petrochemical film on river, lake and sea water areas is developed. Laser meter uses four wavelengths of radiation. It is located at an aircraft carrier, and irradiates the sea surface vertically downwards. It is shown that developed laser four-wave method allows measuring thickness of thin oil films and petrochemical films (thickness less than wavelength of laser radiation) on rough sea surface with an error of 20 percent or less.

Keywords: laser method, sea surface, petrochemical film, film thickness measurement.

REFERENCES

- [1] Drugov Yu.S., Rodin A.A. *Ekologicheskie analizy pri razlivakh nefi i nefteproduktov* [Ecologic analyses of oil and petrochemical spills]. Moscow, BINOM. Laboratoriya znaniy Publ., 2007, 200 p.
- [2] Saksonov M.N., Abalakov A.D, Danko L.V., Barkhatova O.A., Balayan A.E., Stom D.I. *Ekologicheskiy monitoring neftegazovoy otrasli. Fiziko-khimicheskie i biologicheskie metody* [Ecologic monitoring of oil and gas Industry. Physico-chemical and biological methods]. Irkutsk, Irkutsk State University Publ., 2005, 114 p.
- [3] Utkin A.B., Lavrov A., Vilar R. *Proceedings of SPIE*, 2010, vol. 7994, pp. 1–10.
- [4] Babichenk S., Dudelzak A., Lapimaa J., Lisin A., Poryvkina L., Vorobyev A. *EARSeL Proceedings*, 2006, vol. 5, issue 1, pp. 32–41.
- [5] Fedotov Yu.V., Matrosova O.A., Belov M.L., Gorodnichev V.A., Kozintsev V.I. *Vestnik MGTU im. N.E. Baumana. Seria Priborostroyeniye – Herald of the Bauman Moscow State Technical University. Series: Instrument Engineering*, 2010, no. 2, pp. 39–47.
- [6] Belov M.L., Belov A.M., Gorodnichev V.A., Kozintsev V.I. *Optika atmosfery i okeana – Atmospheric and Oceanic Optics*, 2011, vol. 24, no. 7, pp. 568–571.
- [7] Kozintsev V.I., Orlov V.M., Belov M.L., Gorodnichev V.A., Strelkov B.V. *Optiko-elektronnye sistemy ekologicheskogo monitoringa prirodnoy sredy* [Electro-optical system for natural environment ecologic monitoring]. Moscow, BMSTU Publ., 2002, 528 p.
- [8] Kozintsev V.I., Belov M.L., Orlov V.M., Gorodnichev V.A., Strelkov B.V. *Osnovy impulsnoy lazernoy lokatsii* [Basics of pulsed laser location]. Moscow, BMSTU Publ., 2010, 573 p.

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