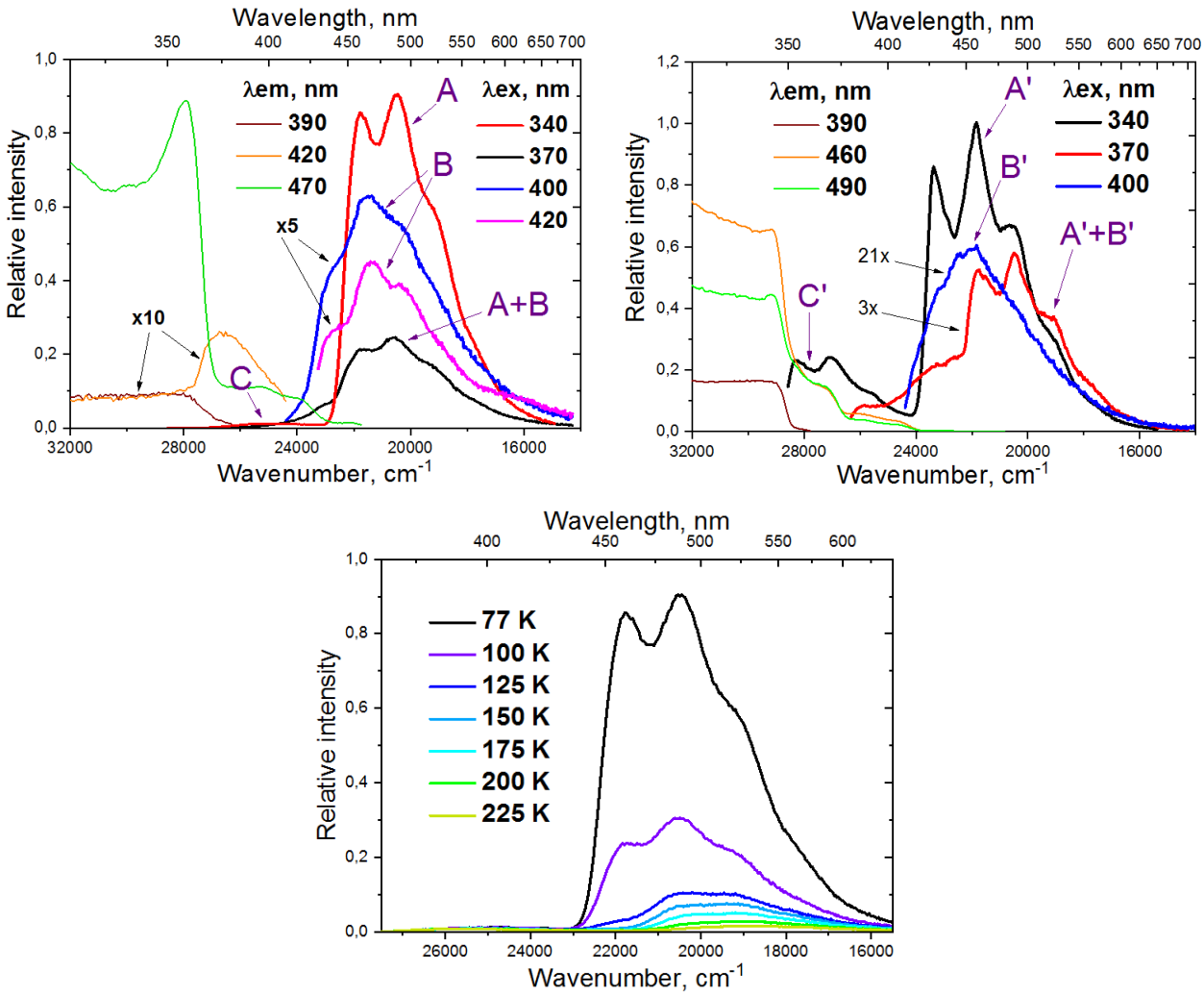

Fig. 3. *Excitation and emission spectra of **1** (left) and **2** (middle) at 300 K; temperature dependence of the emission spectrum of **1** (right)*

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BIODIESEL – PETROLEUM DIESEL – KEROSENE BLENDS CHARACTERISTICS ANALYSIS

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The search for alternative sources of energy and fuel that are renewable and environmentally friendly is currently becoming the most urgent task.

Biodiesel fuel (BioDF) is a new environmentally friendly and the most promising of the existing alternative fuels [1]. The main advantage of BioDF is the possibility of using it not only in its pure form, but also as a blend component of petroleum diesel fuels (DF) [2].

At the same time, unsatisfactory low-temperature properties are a significant drawback of BioDF, which can be improved by mixing with depressant

Table 1. Physicochemical properties of DF/BioDF blends

DF/BioDF blends	ρ at 15 °C, kg/m^3	Viscosity at 20 °C		Viscosity at 40 °C	
		μ, MPa • s	ν, mm^2/s	μ, MPa • s	ν, mm^2/s
95/5	838.90	4.37	5.23	2.79	3.39
90/10	840.30	4.39	5.23	2.68	3.24
85/15	845.50	3.86	4.57	3.36	4.04
80/20	863.20	4.49	5.23	3.27	3.85

Table 2. Physicochemical properties of DF/BioDF/Kerosene blends

DF/BioDF/Kerosene blend	ρ at 15 °C, kg/m^3	Viscosity at 20 °C		Viscosity at 40 °C	
		μ, MPa • s	ν, mm^2/s	μ, MPa • s	ν, mm^2/s
90/5/5	836.90	4.30	5.15	2.71	3.29
85/10/5	840.00	4.90	5.86	2.99	3.63
80/15/5	848.20	3.71	4.38	2.46	2.95
75/20/5	847.40	4.19	4.95	2.64	3.17

Table 3. Low temperature properties of DF/BioDF and DF/BioDF/Kerosene blends

DF/BioDF blends	Cloud point	Pour point	DF/BioDF/Kerosene blends	Cloud point	Pour point
	°C			°C	
95/5	–4	–26	90/5/5	–5	–20
90/10	–3	–27	85/10/5	–5	–17
85/15	–3	–13	80/15/5	–5	–14
80/20	–3	–19	75/20/5	–4	–13

additives or components that have good low-temperature properties (light fractions, kerosene, etc.).

The purpose of the work is to study the feasibility of using kerosene as a low-temperature additive for DF/BioDF blends with BioDF content in the mixture from 5 to 20 % vol.

To achieve this goal, we compare the properties of DF/BioDF/Kerosene blends with the properties of DF/BioDF blends.

For the prepared blends, the density (ρ) at 15 °C, dynamic (μ) and kinematic (ν) viscosity at 20 and 40 °C were determined, the results are presented in Tables 1, 2.

From the results presented in Table 1, it can be seen that with an increase in the content of BioDF, the density of the blends increases, the minimum viscosity is observed for a blend with a BioDF content of 15 % vol.

Based on the results presented in Table 2, we can conclude that the addition of kerosene to DF/BioDF blends on average leads to a decrease in the density and viscosity of blends, which is associated with lower values of these parameters for the kerosene fraction.

An increase in the content of BioDF leads to a deterioration in the low-temperature properties of blends. In addition, the results presented in Table 3 show that the addition of kerosene to DF/BioDF blends leads to a slight decrease in cloud point of blends, but adversely affects pour point. This effect is explained by the content of oxygen-containing compounds in BioDF, which, interacting with kerosene, form substances with unsatisfactory low-temperature properties.

Thus, the addition of kerosene to DF/BioDF blends is not an effective and rational way to improve low-temperature properties.

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