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O‘zbekiston

Kompozitsion Materiallar

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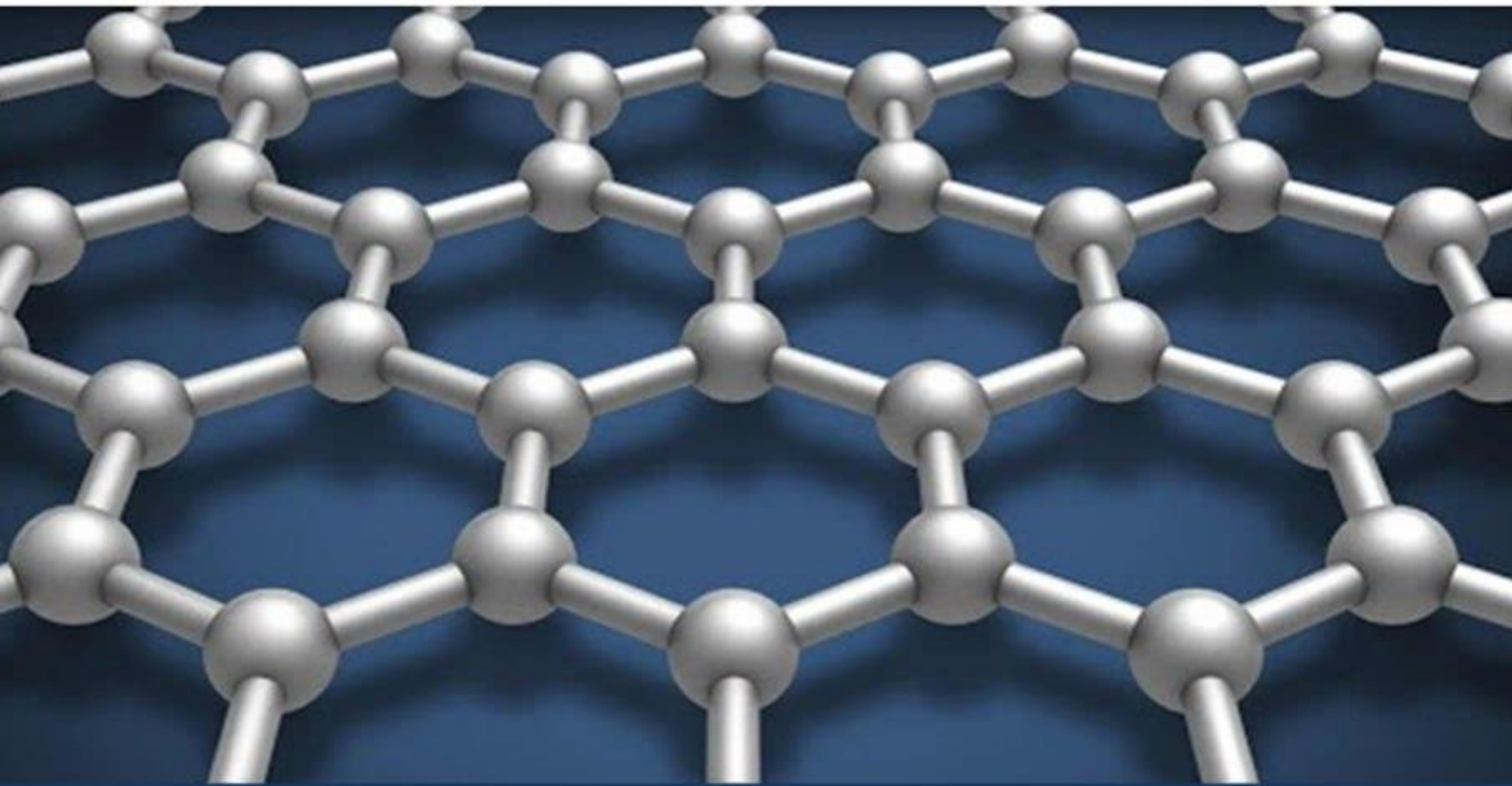

Узбекский научно-технический и производственный журнал

Композиционные материалы

This article proposes a classification scheme for the components of a batch of ceramic fluxes for automatic arc welding, which allows for an initial analysis of the components of the charge. The composition of a ceramic flux is presented that increases the impact-plastic properties of the weld metal by grinding its structure by creating additional crystallization centers and refining the weld with sulfur and phosphorus

UDK 655.344

EFFECT OF THE COMPOSITION OF THE FOUNTAIN SOLUTION ON GRADATION AND COLOR COORDINATES

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Introduction. Despite the intensive development of the printing industry and the contact and non-contact printing methods used, offset printing, which involves the presence in the technological process of a printing form with hydrophobic printing and hydrophilic space elements, is widely used due to its provision of high graphic tone and color rendering. At the same time, stability of the process and quality of reproduction is possible by observing selective wetting of the whitespace elements with a fountain solution, and the printing elements with paint [1-2]. From the analysis of the results of scientific works, it was revealed that in order to ensure selective wetting, it is important to study the supply of a fountain solution, study the influence of the composition of the solution on its performance characteristics, and optimize the component composition, as modern technologies are being introduced into production [3-6].

The purpose of the work is to study the influence of a new composition of a fountain solution on the gradation and color characteristics of prints in sheet-fed offset printing.

Objects and methods of research. The studies were carried out in the conditions of the Polygraph Extra enterprise on an SM 74-4 offset four-color printing machine (Germany). Printing was carried out on three types of papers: offset density (80 g/m^2), coated (90 g/m^2), and 230 g/m^2. Climatic conditions in the workshop: temperature: 240 °C, humidity: 32 %. Machine operating mode: 7000 prints per hour. We used a moisturizing solution, MC, which contained alcoholic waste of the ethyl aldehyde fraction (EAF), with the following parameters: pH = 7.6, electrical conductivity = 245 μS, as studied by the authors previously [7]. For comparison, a moisturizing solution was used: Chembyo Fountain Solution Supreme 22-CS22 (China), which contains 10.12 % isopropyl alcohol [4 (Table 2)]. Soya-Ink offset ink (Korea) was used in the experiments.

The results of experimental studies and their discussion. The gradation transition from 3 to 100 % of the relative area of the raster points of the primary colors was estimated using a control scale placed on the test object by the densitometric method on the ET-120HD spectrodensitometer and the YLD-200 colorimeter. The values are shown in Table 1.

Table 1

Optical densities on the prints printed on the machine "SM 74-4"

The relative area of the raster points on the original, %	Types of paper					
	Offset paper 80 g/m^2		chalked paper 90 g/m^2		chalked paper 230 g/m^2	
	CS22	MC	CS22	MC	CS22	MC
Cyan 100	0,92	0,94	1,45	1,57	1,43	1,51
by ISO 12647-2:2004	1.0		1.45		1.55	
Magenta 100	0,8	0,85	1,4	1,41	1,23	1,37
by ISO 12647-2:2004	0.95		1.4		1.5	
Yellow 100	0,6	0,59	0,94	0,9	0,86	0,89
by ISO 12647-2:2004	0.95		1.25		1.45	
Black 100	1	0,97	1,76	1,79	1,72	1,75
by ISO 12647-2:2004	1.25		1.75		1.85	

A comparative analysis of the values of the optical density of the prints, which quantify the color perception, made it possible to indirectly determine the amount of paint on the surface of the paper and evaluate the balance of the "ink-fountain solution." When using a fountain solution

MC, which contains alcohol waste EAF (ether-aldehyde fraction) and soft desalinated water with a hardness index less than 5, the paint is fixed on the surface without emulsification or reduction of color density. A comparative analysis of optical density using two fountain solutions with standard norms revealed the distribution of the color layer of the main triad within the ISO 12647-2:2004 standards, except for yellow.

The color coordinates of the CIE L*a*b* colorimetric system were used to assess the "ink-fountain solution" balance (Table 2). Which is based on determining the degree of reproduction of the main colors of the subtractive synthesis (cyan, magenta, and yellow) and the points of colors formed when they are superimposed in pairs (blue, green, and red) [8]. Based on the measurement results, color ranges are plotted (Figs. 1–2).

Table 2

Color characteristics of the prints

Color coordinates	a*						b*					
	C	M	Y	R	G	B	C	M	Y	R	G	B
Fountain solution Chembyo supreme 22 - CS22												
Offset paper 80 g/m^2	-19.82	42.68	-1.68	46.26	-34.88	1.78	-28.32	-10.25	50.29	26.24	26.49	-25.16
chalked paper 90 g/m^2	-23.58	57.78	-2.60	69.53	-53.68	10.79	-36.81	-7.70	66.29	46.23	35.46	-48.37
chalked paper 230 g/m^2	-23.91	57.76	-1.53	67.61	-46.60	8.24	-34.77	-9.80	66.53	50.98	44.28	-45.22
Fountain solution MC, which contains alcohol waste EAF												
Offset paper 80 g/m^2	-19.13	47.05	-2.43	51.92	-35.23	3.10	-30.10	-9.08	49.58	26.47	24.59	-26.94
chalked paper 90 g/m^2	-23.34	58.74	-2.79	69.77	-50.32	12.26	-37.68	8.83	61.23	46.34	39.09	-48.76
chalked paper 230 g/m^2	-23.27	61.46	-1.79	71.36	-43.96	7.21	-37.19	-7.32	68.45	53.61	49.86	-43.80

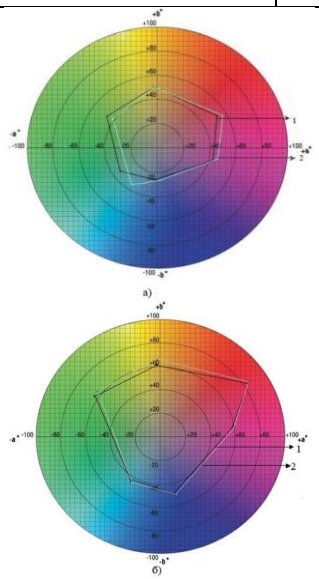

Fig. 1. Color coverage of prints printed on an offset printing machine with 1 Chembyo Supreme 22 fountain solution (China) and 2 fountain solution from local raw materials: a on offset paper with a density of 80 g/m2; b on coated 90 g/m2:

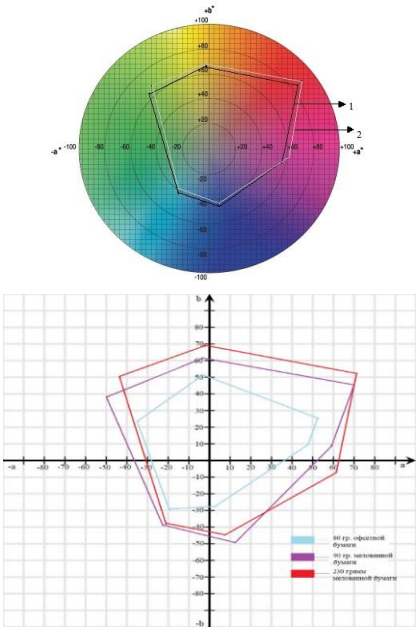

Fig. 2. Color coverage of prints printed on an offset printing machine: a) with a moisturizing solution of Chembyo Supreme 22 (1) and a fountain solution from local raw materials (2) on coated paper 230 g/m2; b) with a fountain solution from local raw materials on papers: offset 80 g/m2, coated 90 g/m2, and 230 g/m2

As can be seen from Figs. 1–2, possible defects such as emulsification of paint, shadowing, dragging, color rendering disorder, and deformation of the paper sheet have not been identified.

Conclusions: To study the effect of the new composition of the moisturizing solution on the quality of reproduction, prints printed on an SM 74-4 sheetfed offset printing machine (Germany) were evaluated by the densitometric method. A comparative analysis of the gradation and color characteristics of prints revealed the possibility of using a fountain solution of a new composition, where a waste etheraldehyde fraction (EAF) is used as an alcohol additive, to obtain prints of stable quality.

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Kalit so'zlar: namlovchi eritma, tarkibi, gradatsiya o'tishi, rang xususiyatlari, nusxalar, bosib chiqarish sifati

Maqolada namlovchi eritma tarkibining ofset bosma sifatiga ta'siri o'rganish maqsadida ofset bosma mashinasida 3xil zichlikdagi qog’ozlarda bosma nusxalar olindi. Namlovchi eritma sifatida spirt sanoati chiqindisi efiraldegid fraksiyasi(EAF) tarkibli – MC eritma ishlatildi. Taqqoslash uchun Chembyo Supreme 22(Xitoy) – CS22 namlovchi eritmasi ishlatilgan. Natijalar densitometrik usul va Cie Lab kolorimetrik tizimining rang koordinatalari qo'llash orqali olindi va izopropil spirti o'rniga EAFdan foydalanish imkoniyati aniqlandi.

Ключевые слова: увлажняющий раствор, состав, градационный переход, цветовые характеристики, оттиски, качество печати

В статье показано влияние состава смачивающего раствора на качество офсетной печати. В целях изучения были получены отпечатки офсетной печатной машине на бумаге 3-х разной плотности. В качестве увлажняющего раствора использовался раствор – МС, содержащий эфирно-альдегидную фракцию(EAF) отходов спиртовой промышленности. Для сравнения использовался увлажняющий раствор Chembyo Supreme 22(Китай) – CS22. Результаты были получены с использованием денситометрического метода и цветовых координат колориметрической системы CIE LAB, и была определена возможность использования EAF вместо изопропилового спирта.

Key words: fountain solution, composition, gradation transition, color characteristics, prints, print quality

In the article, the effect of the composition of the wetting solution on the quality of offset printing was studied. Prints were obtained on an offset printing machine on paper of three different densities. A solution (MC) containing an ether-aldehyde fraction (EAF) of alcohol industry waste was used as a moisturizing solution. For comparison, Chembyo Supreme 22 (China)-CS22 moisturizing solution was used. The results were obtained using the densitometric method and the color coordinates of the CIE LAB colorimetric system, and the possibility of using EAF instead of isopropyl alcohol was determined.

5. Методы исследовании, приборов и оборудований композиционных материалов

6. Проблемные обзоры

7. Вести из лаборатории