

K. A. Antonyuk, cadet , Ivan Kozhedub KharkivNational Air Force University
E. O. Minyaylo, cadet , Ivan Kozhedub KharkivNational Air Force University
S. O. Slabunov, teacher , Ivan Kozhedub KharkivNational Air Force University

MODERNIZATION OF THE ATOMIC-ABSORPTION SPECTROMETER WITH A CONTROLLED ACOUSTIC LIGHTFILTER

Annotation. The method of modernization radiation source atomic-absorption spectrometer by using controlled acousto-optic filter and lamp with continuous spectrum was considered in this work. The wavelength of light can be controlled by changing the frequency of the ultrasonic wave. The frequency is fed to the exciter acousto-optical cell. Advantages and disadvantages of a managed source and advantages of using this method were considered.

Keywords: spectral analysis, atomic-absorption spectrometer Bragg diffraction, acousto-optics.

An analysis of the substance is an important task in many fields of military affairs, industry and medicine. Emission and adsorption methods of analysis are used to make possible the composition of matter and the presence of various impurities in it. The emission analysis is the registration of the substance radiation spectrum, and the adsorption is based on the absorption of light by free substances atoms.

Today atomic-absorption spectrometer is most often used for such an analysis. The main task of the work is modernize the light source in order to automate the management of atomic absorption spectrometer.

The spectrometer consists of a light source, an atomizer, a monochromator and a light receiver. The result of the research will be more precisely, when the band of the wave length range in using for the study light source will be narrower. Modern spectrometers contain several light sources. It is non-electrode lamps, hollow cathode lamps and lasers, which are switched by a stepper motor. In order to increase the measurement speed, it is proposed to use a lamp with a continuous radiation spectrum as a light source, the light from which is fed to a controlled acousto-optical light filter, which selects light. The control is carried out by changing the frequency of ultrasound, which applied to the acousto-optic cell (Fig. 1)

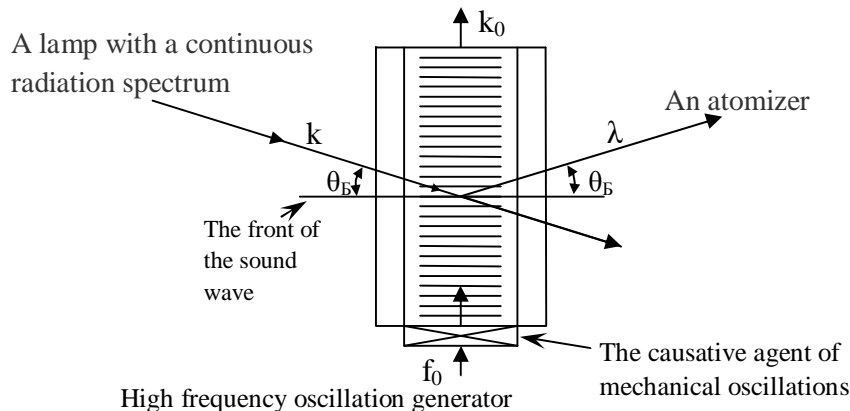


Figure 1. Managed light of the acousto-optic Bragg cell

Frequency changes can occur automatically. It depends on the type of research and applying program. This is the way you can provide a narrow range and avoid moving parts of the installation and reduce the number of light sources.

Literature

1. Купченко Л. Ф., Слабунова Н. В., Гурін О. А. Акустооптический процессор в оптоэлектронной системе, обеспечивающий динамическую спектральную фильтрацию. Формирование и обработка сигналов. – Научно-технический журнал. – Прикладная радиоэлектроника, 2016. – Т.15, № 4. – С. 359 – 361.
2. Купченко Л. Ф., Карлов В.Д., Гурін О. А., Рыбьяк А. С., Слабунова Н. В., Експериментальні дослідження динамічної спектральної фільтрації оптичних зображень з використанням акустооптичного процесора. Вісник Харківського національного університету імені В. Н. Каразіна. – Серія «РАДІОФІЗИКА ТА ЕЛЕКТРОНІКА» Вып. 26. – 2017. С. 58 – 65.