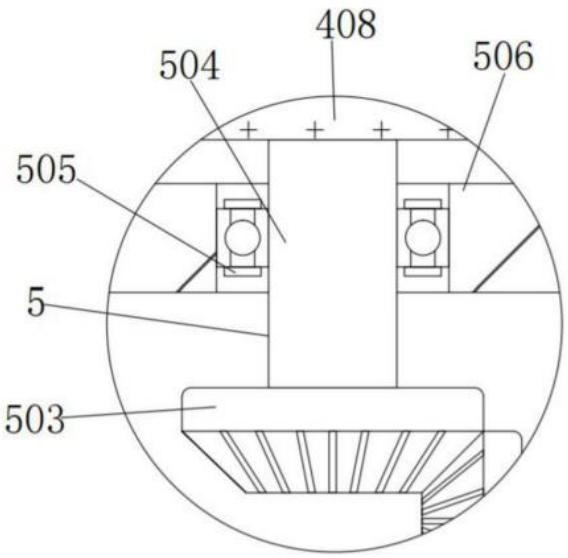

Figure 3 – Battery

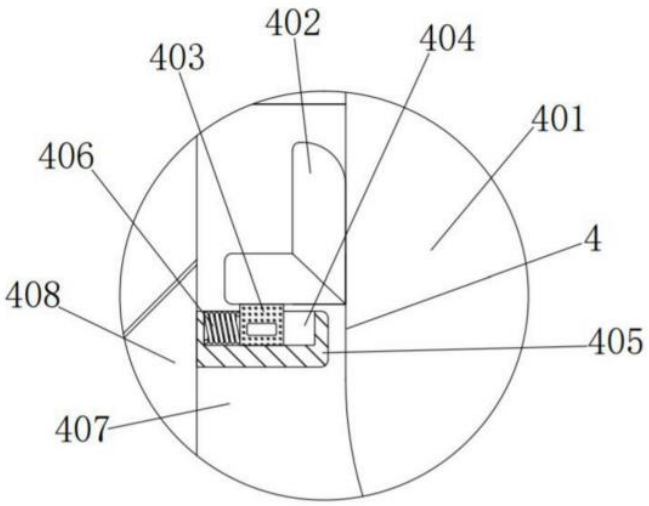

Figure 4 – Fixing mechanism

Through the cooperation between the box, fixed mechanism, battery, refrigerator, motor, first gear, second gear, rotating shaft, sealing bearing and cross plate, the rotating shaft drives the rotary table to rotate, which can rotate multiple containers fixed in the rotary table. The battery supplies power for the refrigerator and motor, and increases the cooling area of the sample in the container and the cooler's cold air, The utility model solves the problem that the existing food microorganism detection sample storage device needs to store the samples at low temperature, and the low temperature state of the samples is affected due to the limited low temperature area of the samples.

Through the cooperation between the box, container, clamping block, sliding block, chute, sliding plate, compression spring, groove and turntable, multiple containers with samples are placed in different grooves on the turntable. The clamping block slides inside and outside the sliding groove on the sliding plate through the sliding block to compress the compression spring. The elasticity of the compression spring gives the clamping block a force towards the inside. The clamping blocks on both sides clamp and fix the container in the box to avoid damaging the container during transportation, To ensure the quality of samples, it solves the problem that the existing food microbiological test sample storage device cannot fix the sample storage container, which will cause damage to the container during transportation, thus affecting the samples.

The food microbiological test sample storage device has been applied for a utility model patent on September 15, 2020, with the application number of 202022014369.1.

УДК 612.845.5: 004.421

荧光可视化探针检测胆红素

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Summary. *The content of bilirubin is an important index to evaluate human health. A special nanocomposite was designed and constructed in this project. The content of bilirubin was detected by the change of fluorescence ratio signal generated when it was combined with bilirubin. Finally, the test paper is prepared to realize the convenient detection of bilirubin.*

Bilirubin is a tetrapyrrole compound produced by heme catabolism, and its normal concentration in healthy human blood is usually within the range of 0.3–1.9 $mg \cdot L^{-1}$. The low level of bilirubin in serum is usually associated with iron deficiency and coronary artery disease;its higher con-

centration in serum (>2.5 mg·L^{-1}) will lead to hyperbilirubinemia. Therefore, the convenient bilirubin test paper designed by the emerging method in this project has important practical significance for the household convenient bilirubin detection of bilirubin. The electrochemical instruments for bilirubin detection on the market are relatively convenient, but they cannot detect bilirubin sensitively, accurately and stably. This kind of test paper prepared by us combines the above two advantages and achieves convenient and sensitive detection. This product will be both affordable and sensitive, and will have a good application prospect in the future for real-time detection of human health.

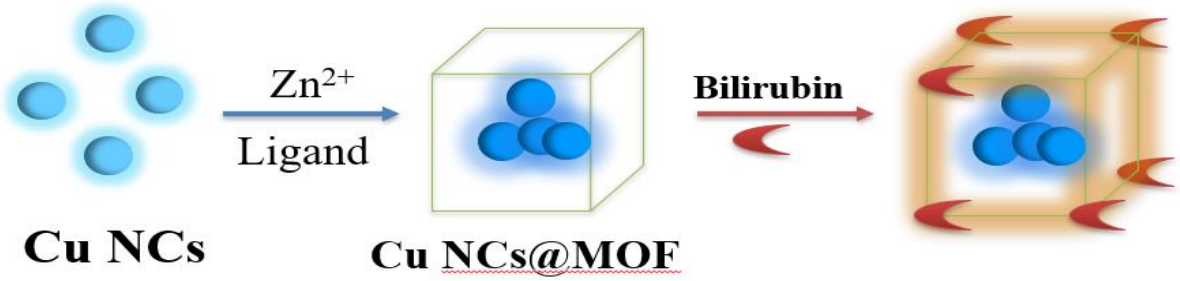

Figure 1

By exploring the conditions of synthesis temperature and PH, CuNCs with long storage time, strongest and stable fluorescence were finally synthesized. Its storage time is long, fluorescence is stable, and there is no trend to weaken (fig. 1).

The synthesis conditions, such as the ratio of copper nanoclusters to zinc nitrate and methyl imidazole, and the reaction time, were optimized, and the appropriate (Cu NCs@MOF) (fig. 2).

The size, morphology and element composition were characterized by transmission electron microscopy and energy spectrum analyzer; The crystal structure of the nano materials was characterized by XRD; The particle size and surface charge state of nano materials were measured by particle size and potential analyzer; The surface functional groups and connecting molecules were confirmed by Fourier transform infrared spectroscopy and nuclear magnetic resonance.

Detect bilirubin solutions of different concentrations, establish a linear equation, and finally show a good linear relationship. The linear correlation coefficient is 0.9933, and the calculated detection limit is 0.33 μM (fig. 3 and fig. 4). The prepared nano probe solution was used to analyze the content of the substance to be measured in human blood and urine samples, and the recovery rate and error were evaluated.

Soak different kinds of 1cm × 1cm paper in the prepared CuNCs@MOF In the solution, after drying wetting drying and other steps CuNCs@MOF Test paper, drop sample to check the feasibility of the test paper to detect the content of bilirubin.

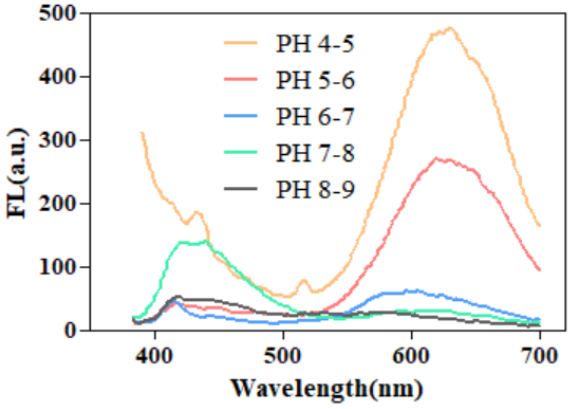

Figure 1

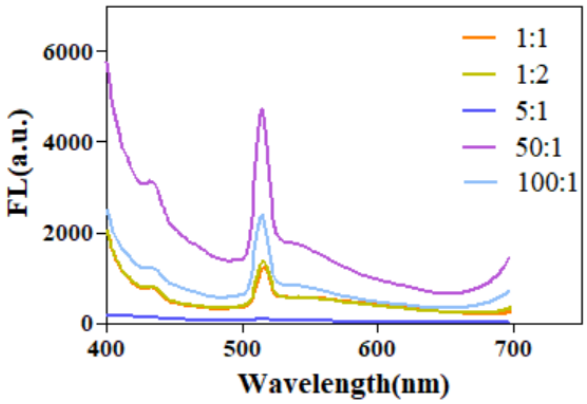

Figure 2

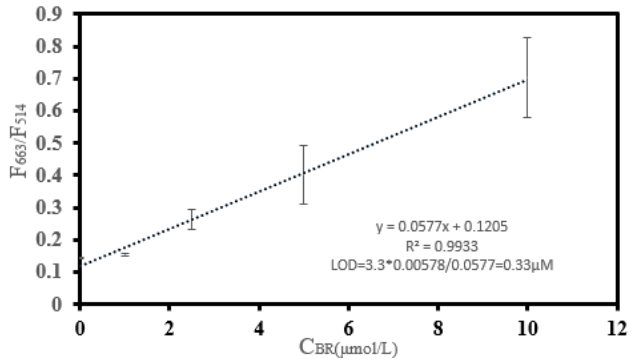

Figure 3

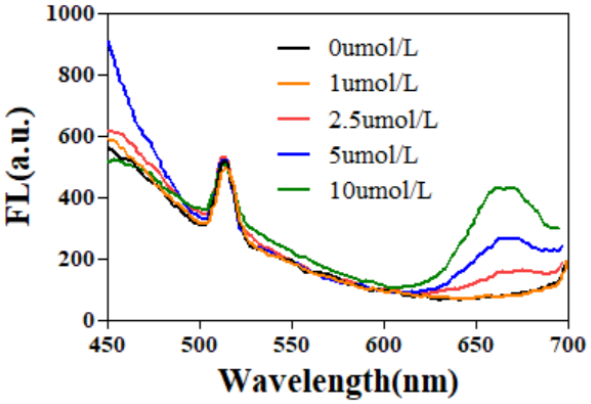

Figure 4

Fluorescence detection method, a new detection technology, is used to detect bilirubin

Prepare the prepared bilirubin nano detection probe into test paper, and finally realize the test paper based detection

This project has constructed a special nanocomposite, which is composed of copper nanoclusters and an organic framework of metal zinc. The composite material can detect and analyze the content of bilirubin more accurately and sensitively according to the change of fluorescence signal peak intensity ratio. It will greatly reduce the time and cost of bilirubin detection to prepare test paper from the prepared bilirubin nano detection probe and realize the test paper based detection, which has broad development prospects.

УДК 616.8-008.64+616-079

将视频多模态情感分析运用在临床抑郁检测中

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Summary. *The current clinical diagnosis of depression in the medical community relies on self-rating scales and physician interviews, but this approach is limited by the expertise of clinicians and the uneven distribution of medical resources. This paper proposes the use of video multimodal techniques in clinical diagnosis, aiming to improve the efficiency and accuracy of depression detection in clinical settings.*

根据世界卫生组织的数据，全球有 2.8 亿人患有抑郁症。仅近三年，全球新增抑郁症患者超过 7000 万人。抑郁症，被称为“21 世纪最大的杀手”。抑郁症是一种严重的心理疾病，不仅会对个人的心理以及身体产生极大的危害，而且也会给家庭、社会带来不利的影响。" 早发现、早治疗 "被认为是这种疾病的最佳治疗方案，这表明需要对抑郁症进行早期筛查。传统的抑郁症诊断依赖于自我评估量表和医生访谈，但这种方法受限于临床医生的专业知识和医疗资源的不均衡分布。人工智能的快速发展为抑郁症的识别提供了一个新的解决方案，有望弥补上述不足。

抑郁症患者语言上常表现为消极、厌世,表情常表现为皱眉和更少的微笑,声音常表现为语速较慢、停顿较多，利用人工智能可以很好的捕捉到这些特征。所以，通过情感分析辅助识别抑郁症是一种趋势，已经有一些研究通过分析社交文本、语音信号或面部图像来检测抑郁症，然而，由于抑郁症的表现形式多样，基于单一特征的抑郁症识别并不能获得足够的信息，导致识别不准确，故论文提出在临床诊断中使用视频多模态情感分析技术来提升抑郁症识别的准确率以及效率。