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摘要：研究在溴化十六烷基吡啶（CPB）存在下，钒（V）与二苯偶氮羧酰肼（DPCO）显色反应的分析特性。在pH5.0的乙酸-乙酸钠缓冲介质中，钒（V）与二苯偶氮羧酰肼（DPCO）和溴化十六烷基吡啶（CPB）的反应迅速完成，生成红色配合物，配合物的最大吸收波长位于540nm，表观摩尔吸光系数 $\epsilon_{540} = 4.1 \times 10^4 \text{ L}/(\text{mol} \cdot \text{cm})$ ，钒含量在0~14 $\mu\text{g}/\text{mL}$ 范围内符合比尔定律。以盐酸羟胺和硫脲作为掩蔽剂可消除 Fe^{3+} 、 Cu^{2+} 等离子的干扰，对大庆原油与锦西减四线馏分油中的钒进行测定，相对标准偏差不大于3.5%，加标回收率为95.2%~104.2%。

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Spectrophotometric determination of trace vanadium in oil with V(V)-DPCO-CPB

Abstract: In the presence of CPB, the chromogenic reaction of V(V) with DPCO has been studied. In HAc/NaAc acid (pH=5.0) medium, vanadium reacts with DPCO-CPB to form a red complex, the maximum absorption wavelength of the complex is 540nm, the apparent molar absorption coefficient is $4.1 \times 10^4 \text{ L}/(\text{mol} \cdot \text{cm})$, and the Beer's law is obeyed in the range of 0-14 $\mu\text{g}/\text{mL}$ for vanadium. The interference of metal ions (Fe^{3+} , Cu^{2+} and so on) in oil can be eliminated by using hydroxyl amino hydrochloric acid and thiourea as masking agents. The speciation of V(V) in Daqing crude oil and JinXi residual oil were determined. Their relative standard deviation is less than 3.5%, and the recovery percentage is in the range of 95.2%~104.2%.

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