TUNGSTEN AND MOLYBDENUM CO-PRECIPITATION BY 
α-BENZOINOXIME FOR ACTIVATION 
ANALYSIS OF TUNGSTEN 

USE OF MOLYBDENUM AS TRACER 
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(Received March 25, 1976) 

The co-precipitation of tungsten and molybdenum by α-benzoinoxime has been studied. Comparison of relative yields for both elements is made. Results showed coincidence and let conclude that molybdenum can be used as tracer to calculate sample to standard relative yield for tungsten. Analyses of water samples for tungsten were made and results were also presented. 

Introduction 

Neutron activation analysis has been extensively applied for tungsten determination in several materials. Despite its high sensitivity, when analysis of very small contents is intended, radiochemical separation is frequently needed. 

Among published methods, use of steps of precipitation by α-benzoinoxime has been reported for isolation of tungsten.\textsuperscript{1,2} Conversion of the precipitate to trioxide is necessary for chemical yield determinations. Considering the fact that molybdenum is precipitated under similar conditions than tungsten, we have explored the feasibility of using tungsten and molybdenum co-precipitation by α-benzoinoxime both as a separation technique and as an indirect method for yield calculation of tungsten through molybdenum. Application to tungsten analysis in water samples is also presented. 

Experimental 

Development of the method 

Experiments were made following the technique described by HILLEBRAND and LUNDELL.\textsuperscript{3} Precipitations by α-benzoinoxime were performed in inactive samples to which 450 μg and 70 μg of irradiated molybdenum and tungsten had been pre-
viously added to serve as carriers and tracers simultaneously. Determinations of absolute yield (Table 1) showed that the procedure was not quantitative, probably due to the fact that carrier masses were very small, however, addition of larger quantities would not be advisable because of the large volume of the precipitate. At

Table 1
Determination of absolute yield for molybdenum

<table>
<thead>
<tr>
<th>Sample, No.</th>
<th>Yield, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>89 ± 1</td>
</tr>
<tr>
<td>2</td>
<td>84 ± 1</td>
</tr>
<tr>
<td>3</td>
<td>88 ± 1</td>
</tr>
<tr>
<td>4</td>
<td>84 ± 1</td>
</tr>
</tbody>
</table>

Peak measured: 140.4 keV from $^{99m}$Tc

Table 2
Comparison of activity ratios for molybdenum and tungsten.
Run No. 1-sample: Sarandi stream

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Molybdenum*</th>
<th>Tungsten**</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/1</td>
<td>0.948 ± 0.004</td>
<td>0.97 ± 0.01</td>
</tr>
<tr>
<td>3/1</td>
<td>0.910 ± 0.004</td>
<td>0.912 ± 0.009</td>
</tr>
<tr>
<td>4/1</td>
<td>0.745 ± 0.004</td>
<td>0.731 ± 0.008</td>
</tr>
</tbody>
</table>

*Calculated by measuring the 140.4 keV peak from $^{99m}$Tc.
**Mean value of yields calculated by measurement of 134.2 keV; 479.5 keV and 685.7 keV peaks from $^{187}$W.

that stage, the question to be answered was whether the yield for tungsten was the same to the one of molybdenum. To search that two runs of four experiments of precipitation were made under similar conditions. Activity ratios for molybdenum and tungsten were calculated with respect to a sample arbitrarily taken as standard (Tables 2 and 3). Maximum disparity between results was 3%, which might be considered small, if statistical errors associated to the measurements were taken into account. Therefore molybdenum could be used as tracer for tungsten yield calculations.

J. Radioanal. Chem. 34 (1976)