

**IN FOCUS**

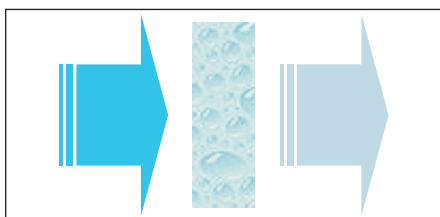
glass analysis  
boron concentration  
neutron transmission

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## Determination of boron in glass with neutron transmission

**Method Description**

Boron is a strong neutron absorber. Irradiating a boron containing sample with a neutron beam, e.g. Am/Be, the loss of intensity on transmission can be used for quantitative purposes.

$$I = I_0 \exp[-\rho \mu \chi]$$

where

$\rho$  is the density of the sample

$\mu$  is the mass absorption coefficient

$\chi$  is the thickness of the sample.

The boron content is determined with respect to well known boron containing reference substances.

**Measured Quantity**

Neutron transmittance.

**Derived Quantity**

Weight percentage  $B_2O_3$ .

**Measuring Range**

0.5 - 30 weight %  $B_2O_3$ .

**Precision**

Standard deviations of 2.5% relative to the given percentage are realised.

**Accuracy**

Depends on the reference materials.

**Possible Errors**

Most elements have a mass absorption coefficient a factor 20 lower than boron. Cd and Li, however, have mass absorption coefficients comparable with boron and thus show strong interference.

**Sampling**

A homogeneous sample of 15 g should be available.

**Calibration**

Measurements are calibrated against Philips reference glasses.

**Measuring Time**

1 day.

**Cost Aspect**

1 man hour.