Customer information

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NANOCOLOR® *NanOx* Metal as microwave digestion

The instructions specify performing the *NANOCOLOR*® *NanOx* Metal digestion (REF 918978) in a heating block. Alternatively, the procedure can also be performed in the microwave.

1. General instructions

Always place the digestion vessel in the same position on the outer edge of the microwave plate. To make work easier, we recommend filling the safety collection vessel with filter flakes or cellulose and covering it with a circular filter if necessary, as well as completely removing the exhaust hose from the expansion tank. The filter flakes or cellulose should be replaced after approx. 5 digestions. If the foil tears, dry the safety collection vessel before the next use or replace the filter flakes or cellulose. For digestion solutions that tend to boil over, we recommend using PTFE boiling aids. After digestion, remove the digestion solution from the digestion vessel. If heavily soiled and after repeated use, clean the digestion vessel with a bottle brush and rinse with distilled water.

2. Required materials

REF	designation
	Microwave oven, e.g., Siemens 750 watts or Panasonic 900 watts with digital display (adjustable to the second)
91640	PTFE- 20 mL pressure digestion vessel with safety collection vessel, sealing and bursting foil set
91643	PTFE- pressure digestion vessel 20 mL
91640.1	PFA- safety catch basin
91646	PFA- Hose connection with screw coupling
91644	20 PFA- sealing films
91645	10 PTFE- bursting films
91628	3 PTFE-boiling aids
481100	Filter flakes 500 g
481110	Filter flakes 1000 g

3. Implementation

1. Pipette 10 mL of sample solution into the digestion vessel.
2. Add 2 level orange measuring spoons of *NanOx* Metal Digestion Reagent AR and close the container.
3. Shake vigorously.
4. Place the digestion vessel on the outer edge of the turntable in the microwave oven and heat for 23 seconds at 900 watts or 28 seconds at 750 watts.
5. Shake the digestion reagent once upside down.
6. Leave to cool for 10 minutes.
   If the liquid is cloudy or not colorless, break down again.
7. Turn the digestion reagent upside down once and open it carefully.
8. Check the digestion solution for peroxide (e.g., with QUANTOFIX® Peroxide 25, REF 91319).
   If peroxide is still detectable, repeat steps 3-8.
9. Add 6 level white measuring spoons of *NanOx* Metal Neutralization Reagent NR.
   The pH value should be between 3 and 7. Add more neutralizing reagent if necessary.
10. Close the digestion vessel and shake thoroughly.

The opened solution can now be used as a sample for follow-up analysis.

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4. Possible malfunctions

A slight nitrous odor when opening the digestion vessel or an unclear digestion solution indicates incomplete digestion. In this case, digestion may need to be repeated several times or diluted to the correct measuring range before digestion.
There may also be other interferences that cannot be easily eliminated by digestion with *NanOx* Metal.

5. Adjustment of irradiation times

The performance of microwave ovens, even those of the same type, can vary from appliance to appliance or change over time. However, when using *NanOx* Metal for digestion, it is important to ensure that the energy supply is precisely dosed. To optimize the microwave time, always select the highest power setting on the appliance (max. 1000 watts). With a microwave with 900 W power, the digestion time is approx. 23 s. Consequently, the digestion time with a microwave with 750 W power will be approx. 28 s.
The following procedure is a very reliable and simple method for determining the required microwave power:
Fill a 100 mL Erlenmeyer flask with exactly 100 mL of water (approx. room temperature) and determine the temperature using a thermometer (e.g., 21 °C). Now place the Erlenmeyer flask filled with water (without the thermometer) on the outer edge of the microwave plate (same location as the digestion vessel) and irradiate it for the previously calculated time (e.g., 28 s). Immediately afterwards, remove the Erlenmeyer flask and determine the water temperature while stirring gently (e.g., 53 °C). The temperature difference must be 30 °C. In this example, the difference is 53 - 21 = 32 °C. The irradiation time must be corrected by this difference.

Target/Actual x time = corrected time

30 / 32 x 28 s = 26,25 s → 26 s

Check this time again in the same way.

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