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INFLUENCE OF CHEMICAL AND THERMAL PRE-TREATMENT ON THE LEACHING BEHAVIOUR OF BOTTOM ASH

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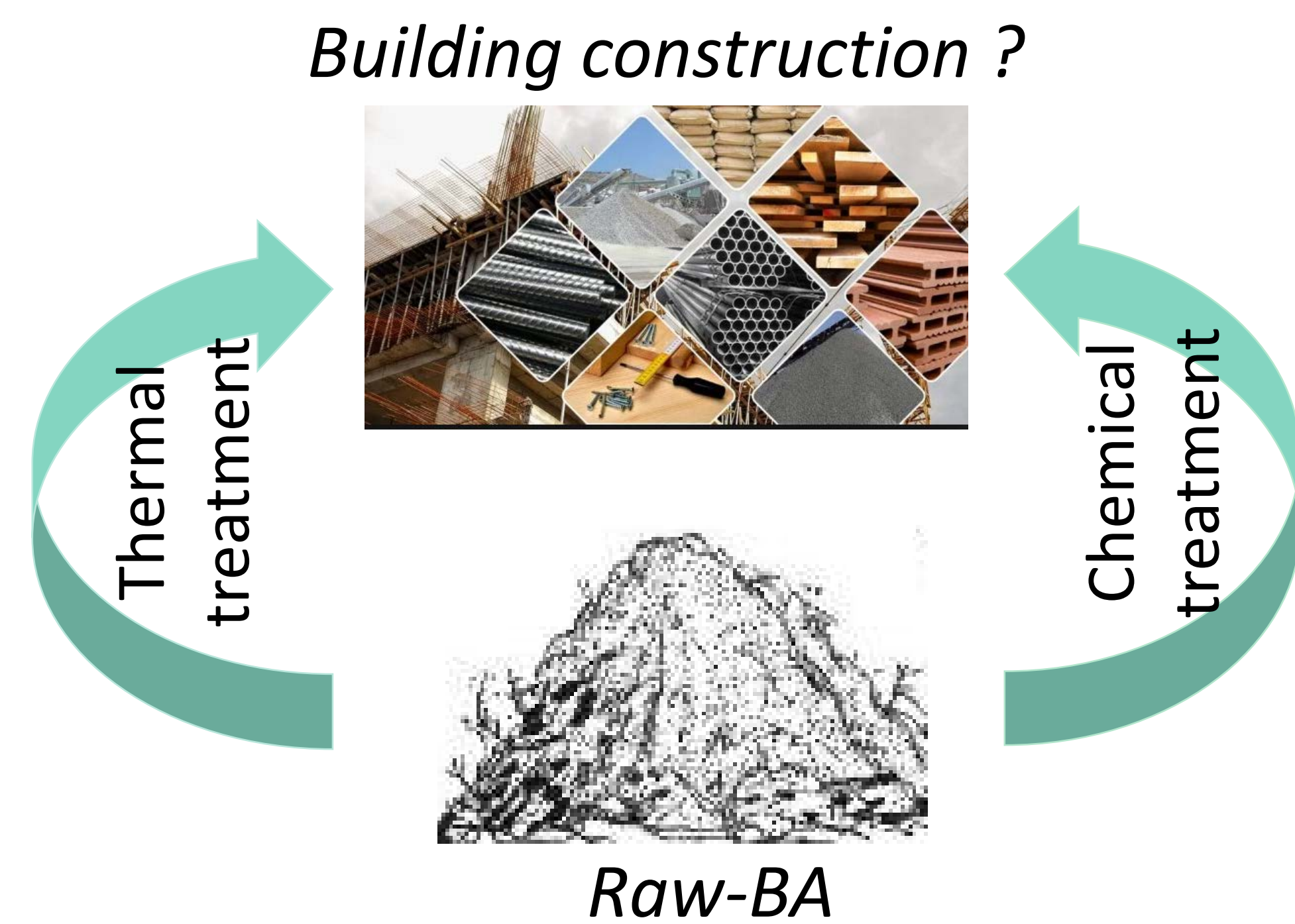
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CONTEXT & OBJECTIVE

In order to obtain a chemically stable and mechanically conform secondary raw material for use in construction, two types of treatment have been investigated.

The influence on the leaching behaviour of target elements, of both **chemical** and **thermal treatments** applied on Municipal Solid Waste Incineration-Bottom Ash (MSWI-BA) were evaluated.



RAW MATERIALS

Raw materials were collected from two waste-to-energy plants located in the Auvergne-Rhône-Alpes region in France:

- **BA-C:** BA for chemical treatment tests
- **BA-T:** BA for thermal treatment tests

BA before recovery of ferrous and non-ferrous metals



BA after sieving and metal recovery



EXPERIMENTAL APPROACH

Chemical treatment protocol (applied on the finest fraction 0-2 mm BA-C:<2)

- **Pre-wash with water:** stirring 60 min; L/S = 2 L.kg⁻¹
- **Extraction with HCl (washing):** 0.18 M, stirring 60 min; L/S = 2 L.kg⁻¹
- **First rinsing with water:** stirring 60 min; L/S = 2 L.kg⁻¹
- **Second rinsing with water:** stirring 60 min; L/S = 2 L.kg⁻¹.

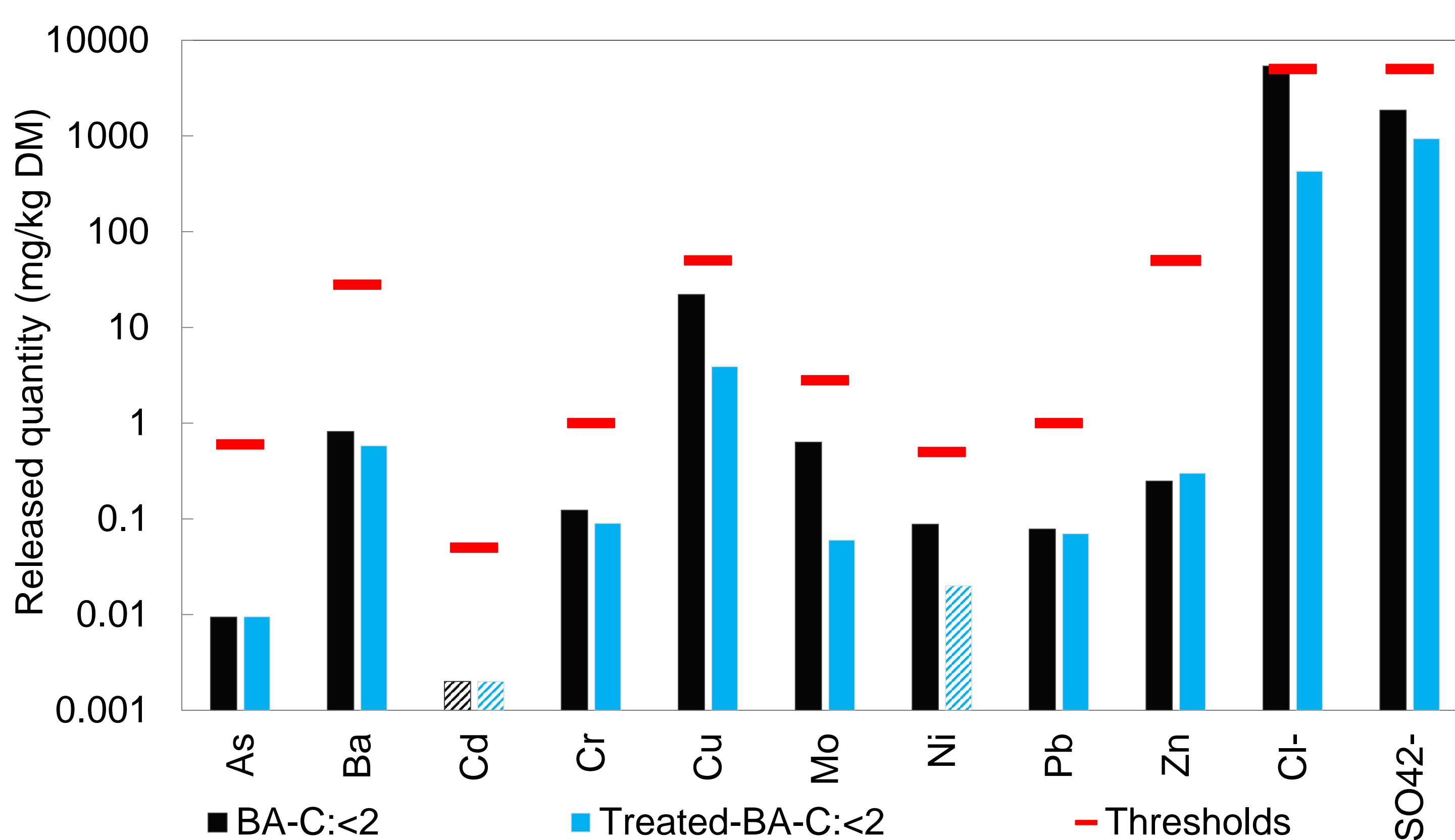
Thermal treatment (applied on the global fraction 0-31.5 mm)

- **Heating at 400 °C** for 60 min (BA-T400)
- **Heating at 700 °C** for 60 min (BA-T700)

The leachability of BA-C and BA-T samples before and after pre-treatment was evaluated according to the **European standard leaching test EN 12457-2**.

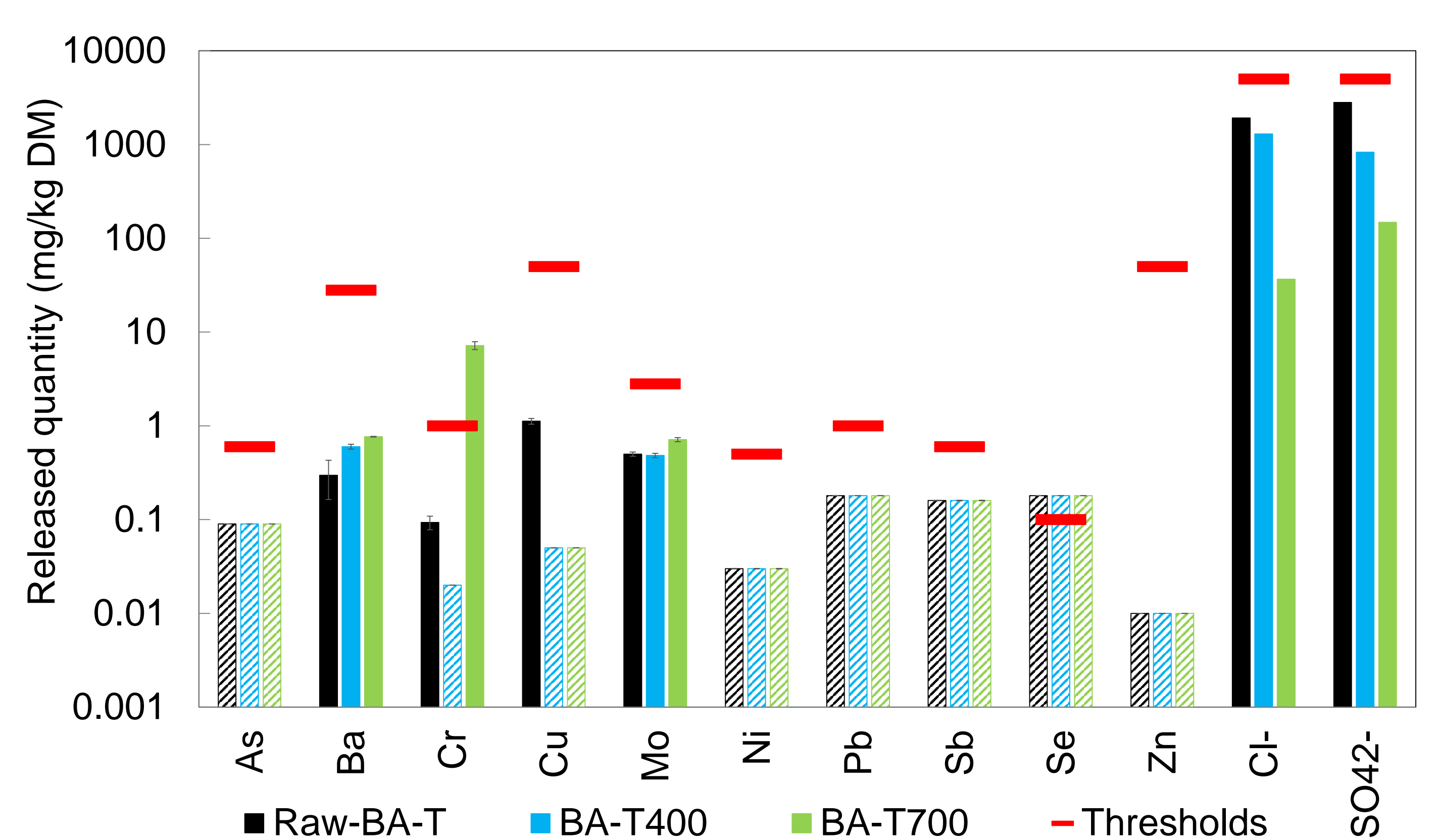
RESULTS

Chemical treatment



Leaching fraction before (BA-C:<2) and after chemical pre-treatment (treated-BA-C:<2). In hatched the values below or equal to the limit of detection. Comparison to the threshold limits (French decree from the 11/18/2011).

Thermal treatment



Leaching fraction of mineral trace elements and anions before (Raw-BA-T) and after the thermal treatment (BA-T400 and BA-T700). In hatched the values below or equal to the limit of detection. Comparison to the threshold limits (French decree from the 11/18/2011).

CONCLUSIONS

The chemical and thermal treatments are efficient to reduce the leaching of most MTE and anions.

All MTE and anions are below the thresholds for secondary road base use, by heating at 400 °C or by using the chemical treatment protocol.

➔ These two treatments seem to be efficient to obtain a more chemically stable BA

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