

## Trends in physical properties of group 2 elements

### Your task

1. Complete the tables below:

Element	Symbol	Z	Electronic configuration
beryllium			
magnesium			
calcium			
strontium			
barium			

Element	Symbol	Z	$r_a$ (nm)	$E_{m1}$ (kJ mol <sup>-1</sup> )	$N_p$	$T_m$ (K)
beryllium			0.125	900	1.5	1551
magnesium			0.160	738	1.2	922
calcium			0.174	590	1.0	1112
strontium			0.191	550	1.0	1042
barium			0.198	503	0.9	998

2. Plot a graph of atomic radius,  $r_a$ , against proton number,  $Z$ , for the elements in group 2.

Describe the trend in  $r_a$  in detail, then explain the trend as fully as you can.

3. Repeat step 2 for each of the other three physical properties:

- first ionisation energy,  $E_{m1}$
- Pauling electronegativity,  $N_p$  and
- melting point,  $T_m$ .

**Note:** You may wish to consider putting all four physical properties on the same axes to allow comparisons to be made.

Remember to define each physical property at the start of an explanation, e.g.

First ionisation energy,  $E_{m1}$  of an element M is the enthalpy change when one mole of gaseous atoms forms one mole of gaseous ions with a single positive charge:

