gridlocks – can you unlock the grid?

Hydroxide precipitates

Before you answer the puzzles below fill in the table of hydroxide precipitates of aqueous metal ions:

metal ion	formula	colour of precipitate with NaOH(aq)	precipitate (ppt) formed
copper(II)	$Cu^{2+}(aq)$		$Cu(OH)_2$
iron(II)	$Fe^{2+}(aq)$	green	
iron(III)	$Fe^{3+}(aq)$	brown	
aluminium		white (dissolves in excess NaOH)	$Al(OH)_3$
calcium		white	$Ca(OH)_2$
magnesium	$Mg^{2+}(aq)$	white	$Mg(OH)_2$

Gridlock 1

Each row, column and 2 x 2 box contains information about the first four metal ions listed above. Use your problem solving skills and the answers in the table above to fill in the blank boxes.

metal ion		colour of ppt with NaOH(aq)	
copper(II)			white (dissolves in excess NaOH)
	aluminium		
		iron(II)	iron(III)

colour of ppt with NaOH(aq)	metal ion

gridlocks – can you unlock the grid?

Gridlock 2

In puzzle 2 you need to first work out which of the four metal ions are in the puzzle and then solve it.

metal ion		colour of ppt with NaOH(aq)	
calcium			
		white (dissolves in excess NaOH)	
		$Cu(OH)_2$	
	$Mg^{2+}(aq)$		
formula		ppt formed	

Gridlock 3

In puzzle 3 you need to first work out which of the four metal ions are in the puzzle and then solve it.

metal ion		colour of ppt with NaOH(aq)	
	calcium		white
			white
$Fe^{2+}(aq)$			$Fe(OH)_3$
formula		ppt formed	

Hydroxide precipitates – answers

Before you answer the puzzles below fill in the table of hydroxide precipitates of aqueous metal ions:

metal ion	formula	colour of precipitate with NaOH(aq)	precipitate (ppt) formed
copper(II)	$Cu^{2+}(aq)$	blue	$Cu(OH)_2$
iron(II)	$Fe^{2+}(aq)$	green	$Fe(OH)_2$
iron(III)	$Fe^{3+}(aq)$	brown	$Fe(OH)_3$
aluminium	$Al^{3+}(aq)$	white (dissolves in excess NaOH)	$Al(OH)_3$
calcium	$Ca^{2+}(aq)$	white	$Ca(OH)_2$
magnesium	$Mg^{2+}(aq)$	white	$Mg(OH)_2$

Puzzle 1 – answers

Each row, column and 2 x 2 box contains information about the first four metal ions listed above. Use your problem solving skills and the answers in the table above to fill in the blank boxes.

metal ion		colour of ppt with NaOH(aq)	
copper(II)	iron(II)	brown	white (dissolves in excess NaOH)
iron(III)	aluminium	blue	green
green	brown	aluminium	copper(II)
white (dissolves in excess NaOH)	blue	iron(II)	iron(III)
colour of ppt with NaOH(aq)		metal ion	

Puzzle 2 – answers

In puzzle 2 you need to first work out which of the four metal ions are in the puzzle and then solve it.

metal ion		colour of ppt with NaOH(aq)	
calcium	aluminium	white	blue
magnesium	copper(II)	white (dissolves in excess NaOH)	white
$Al^{3+}(aq)$	$Ca^{2+}(aq)$	$Cu(OH)_2$	$Mg(OH)_2$
$Cu^{2+}(aq)$	$Mg^{2+}(aq)$	$Ca(OH)_2$	$Al(OH)_3$
formula		ppt formed	

Puzzle 3 – answers

In puzzle 3 you need to first work out which of the four metal ions are in the puzzle and then solve it.

metal ion		colour of ppt with NaOH(aq)	
iron(III)	calcium	green	white
magnesium	iron(II)	brown	white
$Ca^{2+}(aq)$	$Fe^{3+}(aq)$	$Mg(OH)_2$	$Fe(OH)_2$
$Fe^{2+}(aq)$	$Mg^{2+}(aq)$	$Ca(OH)_2$	$Fe(OH)_3$
formula		ppt formed	