

## Editor's choice Modular continuous stirred tank reactor (CSTR) for flow chemistry systems

Vapourtec's modular continuous stirred tank reactor (CSTR) is designed to integrate with its existing E-Series and R-Series flow chemistry systems.

The CSTRs can be used in a cascade under continuous flow conditions.

Each reactor has a reactor volume of up to 40ml and operates within a temperature range of  $-10^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ . The systems operate at pressures up to 5 bar, which allows solvents to be heated well beyond normal reflux temperatures.

The availability of a photochemical light source allows the CSTRs to also undertake photochemical reactions whilst in continuous flow.

Each LED module has an input power of 70W delivering a radiant power up to 40W. The LEDs are dimmable in the range



10% to 100% of maximum power, with wavelengths between 365nm and 700nm.

The LED module can be attached in seconds and requires no tools. Either one or two LED CSTRs can be powered from one standard Vapourtec UV-150 LED power supply.

Vapourtec founder Duncan Guthrie explained: 'In some applications, cascades of CSTRs can be the most practical way of scaling continuous flow processes.'

'The key benefit of a CSTR cascade over a tubular or plug flow reactor is the ability to handle solid reagents, solid by-products or even crystallised solid products,' Guthrie added.

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## November 2024 solutions and winners

### Cryptic

M	I	N	I	C	A	B	S	U	C	R	A	S	E	
O	O		A	A	H		O		N				M	
H	I	T	C	H		R	U	E		N	I	T	R	E
S		W	A		C	A		T		I		R		
M	I	C	H	A	E	L	F	A	R	A	D	A	Y	
A		T	N		L				A		E			
B	O	H	R		S	O	U	R	G	R	A	P	E	S
B		S	T	R	O	N	U	Y	R	R	A			A
A	S	T	R	O	N	A	U	T	S		B	E	L	L
		A	L				H		A		S		T	
H	E	N	R	Y	C	A	V	E	N	D	I	S	H	
E		D		M		T		N		D		A		P
N	A	I	V	E		L	E	I		S	I	N	A	I
R		N	R		A		U			T		O		
I	N	G	E	S	T	S		M	O	I	S	S	A	N

### Quick

B	U	R	N	E	L		J	O	C	E	L	Y	N	
E		E				A	A		A	A	A		E	
L	Y	S	I	S		S	U	M		U	P	P	E	R
L	I		U		E		E		S		T		D	
I	S	O	M	E	R	I	S	A	T	I	O	N	S	
A		T	P		B			I		P				
C	L	A	Y		P	E	C	T	I	C	A	C	I	D
I		N	O		A	A		S	O		A			A
D	I	C	H	R	O	M	A	C	Y		A	M	Y	L
E		O					K		G		P		E	
B	R	U	S	S	E	L	S	S	P	R	O	U	T	
R		N		C		I		H		A		T		O
A	M	I	N	O		M	H	O		Y	I	E	L	D
S		T	P		E		P			R		I		
S	U	S	P	E	N	D		S	I	M	P	S	O	N

### Wordoku

The drug used to treat high blood pressure was VALSARTAN

### Coronene puzzle

- A. Arcana, Incan, Scare
- B. Berber, Curbs, Herbal
- C. Coat, Foam, Prow
- D. Bank, Binge, Rents

The element running across was carbon.

### November winners

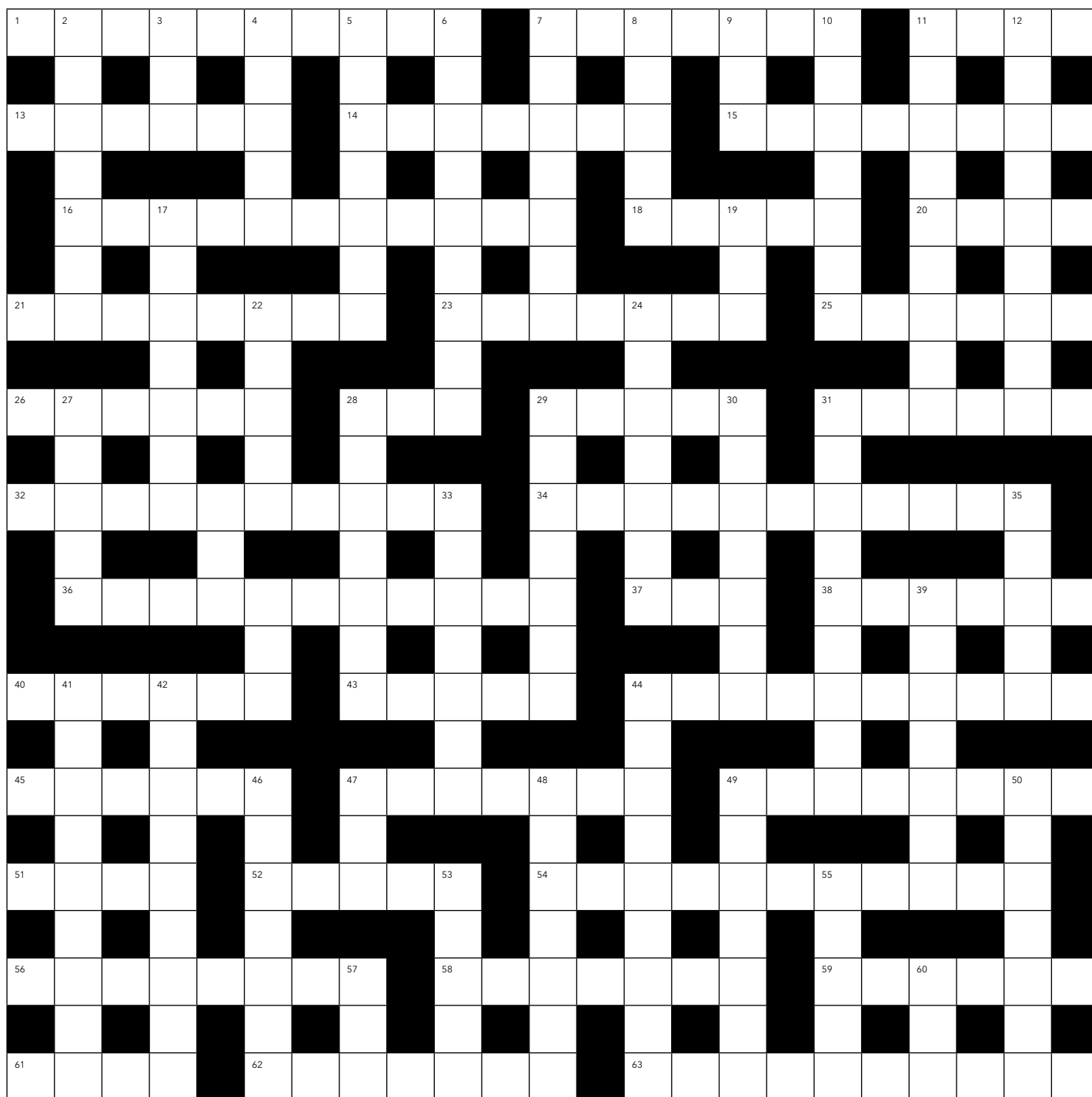
**Coronene**  
A Wilson  
Broadstone, UK

**Wordoku**  
Kathryn Brown  
Etwall, UK

**Cryptic crossword**  
David Francis  
Chandler's Ford, UK

**Quick crossword**  
Peter Ham  
Cardiff, UK

## December 2024 Jumbo CrOsSWORD



### Entry form

This month there are only two prize puzzles: the cryptic elements crossword and the quick regular crossword. For each crossword, a winner will be selected from all the correct entries received. Each winner will receive a hamper just in time for Christmas.

You can enter both of the prize draws, but each entrant is only eligible to win one puzzle prize.

Please enter your details and email a scan or photograph of this page with your completed entries to us by **13 December 2024**. The winners of this month's puzzles will be published in the January 2025 issue, along with the solutions.

Email: [chemistryworld@rsc.org](mailto:chemistryworld@rsc.org)

Name .....

Address .....

.....

Participants are advised that any personal information supplied will be processed in connection with this competition and only in accordance with our privacy statement ([www.chemistryworld.com/privacy](http://www.chemistryworld.com/privacy)).

## Prize entry 1: Cryptic elements crossword

Each crossword square can have one or two letters, which must be letters of an elemental symbol, or the letters D or T (for deuterium or tritium). For example, Dalton could be written D(A)TON.

### Across

- Top tip: a disco clip could be a CD (7, 4)
- Composer prepared initially unscheduled picnic (7)
- 52 Across Sort of itch treated for the physicist (4, 6)
- Poll that is starting slowly in the regions (8)
- Drone on about heartless men being old-fashioned? (9)
- With revision, second son's tune rocks (9)
- Risible bouncer's fashioned materials (8, 7)
- Refuel convertible when it's raining? (3, 2)
- Particular form of Oscar snob? (5)
- 21 See 61 Across (9)
- Love to order a dish and mug in the capital (9)
- Brings virus back perhaps if centres in turmoil (9)
- Fixed car with tinier design? (9)
- Transport the teacher (5)
- Endless biking to India in costume (6)
- Seven-sided pathogen mutated (8)
- Cheerless posts about the old cupboards (7, 7)
- Tuts about son's welfare in places like Kansas? (9, 6)
- It's Sophie's cat upsetting the cultured people (13)
- Criticise rock? (5)
- Girl's inclusive poems are electric (8)
- Extras put inside include a mystic (8)
- Inspectors of beds? (7)
- Chemist character owes all at sea (7, 9)
- Choir outwardly begin rearranging certain passages (7)
- Fancy Mick's left Bath to find a forger (10)
- Brief orders cuts in border clinic (8)
- Race Ben around the drink dispenser (4, 3)
- 21 See 11 Across (6)
- Animator's stunt bizarrely changes (14)
- 56 Could be food for dreams? (10)
- Happy criminal under canvas? (9)
- 59 Slim extremely sick in New York (6)
- 61, 21 Across Doctors catch horde with flick director (6, 9)
- 62 Maybe classy tat can get things going? (9)
- 63 Somehow stole tankards when no-one could see! (5, 8)

### Down

- Surprisingly skip over the mineralogist (8)
- Flip coin for the painting (4)
- Top dog leaves Alfred's small company dining outside (8)
- Buck after pubs right inside the city (9)
- Insect bit anchorman abroad (8, 4)
- Recorded delivery - posted card right away for redistribution (9)
- Recycling carton for the physicist (6)
- Bird is barely in sight to begin with (4)
- Poison here can create a charged atmosphere (10)
- Ref took bets about the German festival (11)
- Totter into working painter (10)
- Lip about Hogarth print? (10)
- Some insecure people return to the country (4)
- Caution cop about the job? (10)
- 24 Mike's sons concocted flavour (9)
- 27 No approvals for the recesses? (5)
- 28 Form prepared nicest trout with no resistance (10)
- 29 Buses holding functions could be limited (10)
- 30 Inventor notes alkali compound (6, 5)
- 31 Heroic cycle around Turkish capital has a different ring to it (12)
- 33 Philosophical about acoustic (8)
- 35 Disturbing duress playing second fiddle with more froth? (7)
- 39 Emperor's current riot about H<sub>2</sub>O? (8)
- 41 Drunken prof woos her with protection from the rain (11)
- 42 Free to distribute if announced without first aid (10)
- 44 Physicist threw lanterns around (7, 6)
- 46 If on air, oddly Nick's broadcast cannot be heard (10)
- 47 Go back into outskirts of Brussels to find the marshes (4)
- 48 I must turn nests into filth (10)
- 49 Most healthy used short street on arrangement (8)
- 50 Odd carpet smells found in suburbia? (9)
- 53 Pawns the German wines (5)
- 55 Counted on final rivet before becoming corroded (7)
- 57 Pinch a piece of waste aluminium (5)
- 60 Tattoo a little pinky (3)

## Prize entry 2: Quick crossword

This one is a regular crossword; no element symbols are needed.

### Across

- Venture (10)
- 41 Down Influential chemist who was guillotined during the French revolution (7, 9)
- See 4 Down (4)
- Type of bean also known as the red mung bean (6)
- Copper, tin and zinc alloys used in imitation gold jewellery (7)
- Element first isolated by Friedrich Oskar Giesel in 1902 who gave it the name *emanium* (8)
- Mathematician and writer who worked with Charles Babbage on the *Analytical Engine* (3, 8)
- German chemist who shared the 1950 Nobel prize in chemistry (5)
- Measure of time (4)
- Draws (8)
- Superheavy element named after the German state it was discovered in (7)
- See 34 Across (6)
- Tranquil (6)
- Mayday call (3)
- Cookers (5)
- The smell of cyanide to some (6)
- Describing plants that prefer a low pH (4-6)
- 63 Across, 25 Across Title of a series of lectures given by 62 across at the Royal Institution in 1848 (3, 8, 7, 2, 1, 6)
- Penicillin antibiotic (11)
- State of matter (3)
- 7 Down Physical chemist who worked on phase transitions between liquids and gases (6, 7)
- Common name for sodium hypochlorite (6)
- Most substantial course in a meal (5)
- Yellow-red to reddish-orange varieties of grossular (10)
- Develop gradually (6)
- Subatomic particle also known as the pion (2, 5)
- Maritime sheets (8)
- One eighth of a gallon (4)
- Co-discoverer of the double helix structure of DNA (5)
- Greenish (11)
- 55 Down Danish anatomist, geologist and proponent of crystal structure (8, 5)
- See 62 Across (7)
- US physicist and prolific inventor (6)
- Physical chemist who isolated deuterium in 1932 (4)
- 58, 58 Across British chemist, physicist and inventor who discovered benzene (7, 7)
- See 34 Across (7, 2, 1)

### Down

- See 9 Down (7)
- Large flightless bird (3)
- 11 Across Italian chemist and author of *The Periodic Table* (5, 4)
- Propan-1-ol and propan-2-ol for instance (7)
- Optical health and safety kit found in laboratories (9)
- See 38 Across (7)
- Electrical engineer and the name of an electric car company (5)
- 2 Down German chemist and co-discoverer of rhenium (3, 7)
- In the intestines (7)
- Element discovered by Swedish chemist Carl Gustaf Mosander in 1839 (9)
- French analytical chemist who discovered chromium and beryllium (9)
- Medication to relieve heartburn and indigestion (7)
- Not bright (3)
- Another name for calcium hydride (9)
- Mass of frozen water in the sea (7)
- Elastane (5)
- Old name for antimony, whence it gets its elemental symbol (7)
- Compounds with the formula C<sub>8</sub>H<sub>18</sub> (7)
- Medium-grained metamorphic rocks (7)
- First person to walk on the moon (9)
- Element predicted by Dmitri Mendeleev who called it *eka-aluminium* (7)
- Holiday entitlement (5)
- Magnesium iron silicate mineral which is the primary component of the Earth's upper mantle (7)
- See 7 Across (9)
- Property describing the various forms of a substance (9)
- 0.01 (9)
- Shout (7)
- Φ (3)
- More than a few (7)
- Madder and cochineal for example (3, 4)
- Alights (4, 3)
- Prague author of *The Metamorphosis* (5)
- See 56 Across (5)
- Pouch (3)
- League of leading American universities (3)

Crosswords compiled by Paul Board, whose puzzle book *Elementary!* is available to order online at: [rsc.li/ElementaryBook](http://rsc.li/ElementaryBook)

Last month's puzzle solutions and winners can be found on p57.