James Webb Space Telescope will reveal new insights into astrochemistry
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On Dec. 18, the James Webb Space Telescope (JWST) will launch from French Guiana to its destination almost a million miles from Earth. The telescope will give scientists unprecedented views of chemistry occurring throughout the universe. This information will provide new insights into how planetary systems form and whether life-sustaining conditions exist elsewhere in the universe, according to a cover story in Chemical & Engineering News.

The JWST results from a two-decade collaboration among NASA, the European Space Agency and the Canadian Space Agency, writes Associate Editor Sam Lemonick. The telescope, originally set to launch in 2007, has faced criticism for delays and for costing $9.5 billion over the original price tag of $500 million proposed in 1996. But scientists are excited to see what the telescope can observe that its predecessor, the Hubble Space Telescope, cannot. The JWST's gold-coated beryllium mirror will be the largest ever flown to space, requiring it to fold into segments for transport by rocket. The large mirror and infrared instruments can detect molecules such as water, carbon dioxide and ammonia in distant planets' atmospheres and in cosmic ice and dust.

Scientists have already scheduled more than 250 research projects for the JWST, with more to come. Many of these projects leverage JWST's unique abilities to study protoplanetary disks—the rotating disks of ice and dust that surround young stars, where planets, asteroids, comets and other bodies are born over billions of years. Mapping the chemical constituents of the disks could provide clues about how planetary systems form, and whether they could have a chemical makeup that supports life. Other projects involve studying the atmospheres of exoplanets. A few of the slated research projects will examine objects in our own solar system, such as the icy moons of Saturn and Jupiter. As the launch date approaches, astrochemists are filled with a mixture of nervousness over hopes for a successful deployment, and excitement for the dazzling array of new data the telescope could provide.

More information: Article: cen.acs.org/physical-chemistry...hemistsnewest/99/i41

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