Five symbols used in chemistry

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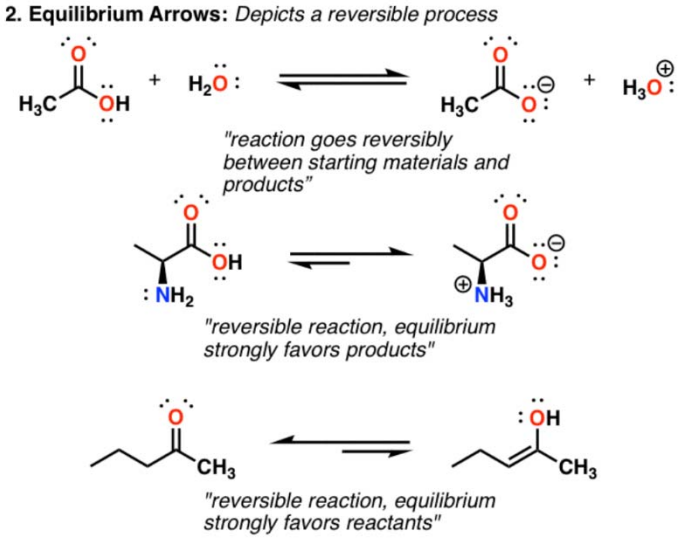
Unicode has many arrow symbols (see arrows in the blocks U+2190..U21FF, U+27F0..U+27FF, U+2900.U+297F, U+2B00..U+2BFF, and U +1F800..U+1F8FF). Nevertheless, there are four stretchable arrow characters and a standard symbol that are used in chemistry and are not encoded in the Standard and we feel should be. The first three of the arrow symbols are commonly used in equilibrium equations. They, along with suggested names and locations are:

BALANCED EQUILIBRIUM ARROW (U+2B96)	
EQUILIBRIUM ARROW LYING TOWARD THE RIGHT (U+2B74)	
EQUILIBRIUM ARROW LYING TOWARD THE LEFT (U+2B75)	

The images come from the commonly used mhchem TeX macro package (see "REACTION ARROWS") A search for "equilibrium arrows" will turn up many examples, but here are three examples:

https://www.masterorganicchemistry.com/2011/02/09/the-8-types-of-arrows-in-organic-chemistry-explained/.



https://chem.libretexts.org/Ancillary_Materials/Worksheets/Worksheets%3A_Inorganic_Chemistry/Structure_and_Reactivity_in_Organic_Biological_and_Inorganic_Chemistry_(Chem_315)/3%3A_Understanding_Mechanisms/3.3%3A_Arrow_Conventions

https://blog.cambridgecoaching.com/guide-to-deciphering-chemistry-arrows

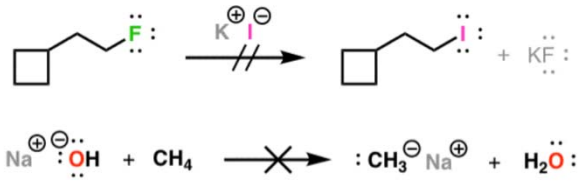
The fourth proposed arrow symbol is:

REACTION DOES NOT PROCEED (U+1F8B2???)	

This symbol can be produced in the popular (in chemistry) WYSWYG ChemDraw package. Here are a few sites that show its use:

https://www.masterorganicchemistry.com/2011/02/09/the-8-types-of-arrows-in-organic-chemistry-explained/. For example (lower arrow)

7. Broken arrows: *Shows an unsuccesful reaction*



"We tried these reactions and they don't work"

https://www.thoughtco.com/chemical-reaction-arrows-overview-609203

https://blog.cambridgecoaching.com/guide-to-deciphering-chemistry-arrows

The fifth symbol is the standard state symbol:

STANDARD STATE SYMBOL (no suggested location)	⦵

In TeX, this symbol is produced by overlaying characters. One small macro package that is dedicated to producing just this symbol is plimsoll.pdf. Note: there is a slightly similar existing character: U+29B5. However, the standard state symbol should have a significantly longer horizontal line (as mentioned in the Wikipedia link).

More specifically, in chemistry, the **standard state** of a material (pure substance, mixture or solution) is a reference point used in the Wikipedia article:

> A superscript circle ° (degree symbol) or a Plimsoll (⦵) character is used to designate a thermodynamic quantity in the standard state, such as change in enthalpy ($\Delta H°$), change in entropy ($\Delta S°$), or change in Gibbs free energy ($\Delta G°$).[1][2] The degree symbol has become widespread, although the Plimsoll is recommended in standards, see discussion about typesetting below.

See also https://iupac.org/wp-content/uploads/2019/05/IUPAC-GB3-2012-2ndPrinting-PDFsearchable.pdf (search for “standard state”) and https://www.coursehero.com/study-guides/introchem/standard-states-and-standard-enthalpy-changes/. In chemistry publications, these five symbols are produced by overlays/TeX macros. So, it is easy to get examples of them in the right size, but until they are in Unicode, it is unlikely any font would have them.

Joseph Wright is one of the people who asked for these chars because a group he is in is trying to update the "IUPAC Green Book (symbols for physical chemistry), and that group is trying to get symbols properly standardised in the way things are presented." So, there is an international group (International Union of Pure and Applied Chemistry) waiting on this proposal.