catalytic current

The faradaic current that is obtained with a solution containing two substances \( B \) and \( A \) may exceed the sum of the faradaic currents that would be obtained with \( B \) and \( A \) separately, but at the same concentrations and under the same experimental conditions. In either of the two following situations the increase is termed a catalytic current. \( B \) is reduced or oxidized at the electrode-solution interface to give a product \( B' \) that then reduces or oxidizes \( A \) chemically. The reaction of \( B \) with \( A \) may yield either \( B \) or an intermediate in the overall half-reaction by which \( B' \) was obtained from \( B \). In this situation the increase of current that results from the addition of \( A \) to a solution of \( B \) may be termed a regeneration current. The presence at the electrode-solution interface of one substance, which may be either \( A \) or the product \( A' \) of its reduction or oxidation, decreases the over-potential for the reduction or oxidation of \( B \). In either case the magnitude of the catalytic current depends on the applied potential. If the current observed with a mixture of \( A \) and \( B \) is smaller than the sum of the separate currents, the term non-additive current should be used.

Source:
PAC, 1985, 57, 1491 (Recommended terms, symbols, and definitions for electroanalytical chemistry (Recommendations 1985)) on page 1494