

Generation and selection of chemical product concept using network optimization

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This paper aims to propose a systematic process for generation and selection of the chemical product concept. The chemical product concept had been generated and selected with product designer's intuition and experience. To improve this empirical process, systematic ideas such as classification tree, combination table, and selection matrix were proposed. However, these ideas could not solve the needs of the experienced designers at concept selection process, they were limited. In this paper, we propose a network of sub concepts to solve the problems. Using the sub concepts as node, the network is organized. The interactions with the sub concepts are considered by synergetic arc. By this network organization, concepts of chemical product are systematically generated. The network optimization is used to select the best concept satisfied the customer's needs and the product constraints like cost, safety, legal issues. The minimum cost flow problem is applied to optimize the proposed network. Design of a medical diagnosis tool is presented as a case study.