

химической промышленности в сухом безводном обезвреженном (рН= 7-9) состоянии. В этом случае после измельчения и модифицирования упрочняющей добавкой фторангидрит превращается в техногенное ангидритовое вяжущее, на основе которого в 70-х годах прошлого столетия в Японии, в 90-х и двухтысячных годах на Урале и в Западной Сибири в промышленных масштабах получали различную ангидритовую строительную продукцию по ресурсо- и энергосберегающим технологиям. Несмотря на очевидное преимущество вовлечения в дальнейшую переработку указанных отходов производства, нестабильность их свойств и и некоторых материалов на их основе вызывали рекламации от потребителей ангидритовой строительной продукции.

Сотрудники ТПУ, ТГАСУ, ВКГТУ и ТУСУРа, объединив свои знания и опыт, разработали основные критерии, при соблюдении которых на примере фтороводородных производств, будет осуществляться получение техногенного ангидрита и ангидритового вяжущего на таких предприятиях, как ОАО «Галополимер», г. Пермь, ОАО «СХК», г. Северск Томской области, АО «УМЗ», г. Усть-Каменогорск, (Казахстан) со стабильными свойствами, а на основе техногенного ангидрита предлагается получение ресурсосберегающей строительной продукции, например, половые стяжки, штукатурные растворы, листы ПАНО (Панели АНгидритовые Отделочные), каркасно-монолитные модули помещений, изделия малых архитектурных форм, композиты буровых и тампонажных растворов и др.

The use of sulphate-calcium solid waste in resource-saving production of building materials and alternative products

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The presence of sulphate-calcium waste in the chemical industry causes the desire of researchers and practitioners-production workers both in Russia and abroad to turn the above-mentioned waste into a target

product useful in the national economy. The source of these wastes is chemical production of hydrogen fluoride, production of phosphate fertilizers and phosphoric acid, production of boric acid, titanium production, etc. In most technologies, calcium sulphate waste is released into the environment in the form of two-water gypsum (cities of Voskresensk, Lermontov, Cherepovets, Polevskoy, Komsomolsk– on – Amure). In the nuclear industry, in the production of hydrogen fluoride in Seversk and Ust-Kamenogorsk, waste is obtained in the form of anhydrous calcium sulphate, but at the Ulba metallurgical plant in Kazakhstan until today, acidic hydrofluoric acid is dumped by dump trucks to the dump field located on the banks of the r. Irtysh, and in Seversk, this waste is neutralized with sodium alkali, pulped and thrown into the r. Tom, and then - in p. Ob. TPU staff and many other researchers have proved the economic efficiency of using sulphate-calcium waste in the construction industry as a binder in cementless anhydrite composites. But economic efficiency is manifested only in the case when sulphate-calcium waste is extracted from the chemical industry in a dry anhydrous neutralized ($\text{pH} = 7-9$) state. In this case, after grinding and modifying with a hardening additive, the fluoro-anhydrite is transformed into a technogenic anhydrite binder, on the basis of which in the 70s of the last century in Japan, in the 90s and 2000 years in the Urals and in Western Siberia, various anhydrite building products were obtained on an industrial scale on resource and energy saving technologies. Despite the obvious advantage of the involvement in the further processing of these production wastes, the instability of their properties and some materials based on them caused complaints from consumers of anhydrite building products.

Employees of TPU, TGASU, EKSTU and TUSUR, combining their knowledge and experience, developed the main criteria, subject to which, using the example of hydrogen fluoride production, will be produced technogenic anhydrite and anhydrite binder at such enterprises as JSC «Halopolimer», Perm, JSC «SCC», Seversk, Tomsk Region, JSC «UMP», Ust-Kamenogorsk, (Kazakhstan) with stable properties, and on the basis of technogenic anhydrite, it is proposed to obtain resource-saving construction products, for example, floor ties, plasterers e solutions, panel PANF (Panel ANhydrite Finishing), frame-monolithic modules Improvement, products of small architectural forms, composites drilling and grouting mortars etc.